PROBLEMS OF SOCIAL WELL-BEING

JAMES H. S. BOSSARD

UNIVERSITY OF PENNSYLVANIA
SOCIAL SCIENCE SERIES

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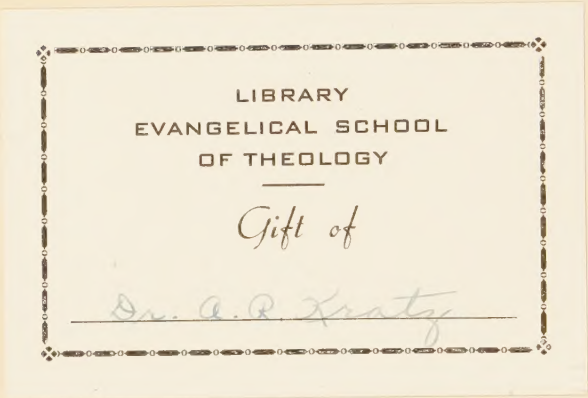

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By

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TO

CARL KELSEY

TEACHER, COUNSELOR, FRIEND

UNITED THEOLOGICAL SEMINARY

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EDITOR'S INTRODUCTION

At the present time there is a pronounced trend in all forms of science dealing with human relations and life problems to emphasize the essential unity and interdependence of social factors. Professor Bossard's book is a contribution to the intelligent understanding of social well-being viewed in its economic, physical, and mental aspects. A book of this sort should do much to correct the misunderstandings which follow upon over-specialization. The standard of living has its physical and mental aspects as well as its economic basis. Health and physical welfare cannot be understood apart from considering the economic and the psychological. Moreover, the economic, physical, and psychological elements of social well-being are essentially problems of social adjustment. These problems of interdependence and interrelation are approached in the present book in a manner that is critical and yet characterized by real understanding.

F. Stuart Chapin
University of Minnesota

PREFACE

For a number of years I have sought to interest university students in the scientific study of social problems. At first these efforts centered about the traditional course given in colleges and universities under such titles as "Social Pathology," "Poverty and Dependency," "Social Maladjustment," and the like. As time went on, it became rather apparent that, whatever the particular social problem or situation discussed, certain constituent elements tended constantly to appear. Three such basic factors could be identified. The first was *economic* in its nature, comprehending the various problems of Income; the second might be termed *physical,* with its questions of Health and Physical Welfare; the third was *psychological,* involving the problems of Mental Hygiene. I came gradually to think of these three—Income, Health, and Mental Hygiene —as the bases of social well-being. Ultimately, the logic of the facts led me to reconstruct my approach to social problems, to the end that these basic problems receive adequate emphasis.

There really seems to be no reason for continuing to deal in our courses in social problems with the end-products of social ill-being. Thinking constructively, the elimination of industrial accidents needs emphasis more than the care of dependent children; the problem of preventable death is more fundamental than that of widowhood, even if somewhat less dramatic; the control of gonorrhea contributes more to social well-being than does the education of blind youth. It is the purpose underlying these pages—that these more basic problems receive consideration.

The interest which successive vintages of undergraduates have shown in the discussion of these bases of social well-being has inspired the hope that it might have some appeal to a larger audience. Obviously the book is written to interest students and the general public, not to impress reviewers. Naïve as it may seem, I am more interested in the human

aspects of the problems discussed than in the formulation and illustration of sociological principles. To the criticism that this volume contains so little reference to such principles I must confess, by way of reply, to a considerable skepticism concerning our identification to date of many such principles.

It is not possible to name all of the persons who have aided me in the preparation of this volume, even though I am aware and appreciative of my indebtedness to them. Wherever I have taken the language or consciously followed the thought of another, formal acknowledgment has been made. From my associates in the department of Sociology at the University of Pennsylvania have come many valuable suggestions. Particularly to be mentioned are Dr. W. Rex Crawford and Mr. W. Wallace Weaver, who have been closely connected with my classroom work. Professor Stuart A. Rice and Assistant Professor Clifford B. Kirkpatrick, of the department of Sociology, and Professor Samuel W. Fernberger, of the department of Psychology, have each read several chapters, and their comments have been most helpful. To Professor F. Stuart Chapin, the editor of this series, I am indebted for excellent suggestions which have been incorporated into the text. To the members of my family group I owe much for their constant encouragement and their patient coöperation. Miss Ann Berchmans Flynn has been most efficient in the technical preparation of the manuscript, a service which I take pleasure in acknowledging.

My heaviest indebtedness is to Professor Carl Kelsey, my former teacher and now my senior associate in the department of Sociology at the University of Pennsylvania. It was he who first gave scientific direction to my social interests. In the years since he has been an invaluable counselor and a source of help in many ways. His influence, both as teacher and as associate, has been at all times suggestive rather than dictatorial, inspirational rather than dogmatic. In appreciation, I dedicate this volume to him.

JAMES H. S. BOSSARD.

Philadelphia, July, 1927

INTRODUCTION

CHAPTER I

SOCIAL WELL-BEING: ITS MEANING AND IMPORTANCE

We are all interested in being well. Analysts of human nature universally recognize this characteristic and emphasize its fundamental nature. Nor is this interest peculiar to man. Some manifestation of it is to be found in all forms of life. Its presence is necessary for survival.

THE MEANING OF SOCIAL WELL-BEING

Well-being, like a great many other terms having the sanction of popular usage, is not easy to define. Manifestly, it implies the state of being well. But this connotates a subjective condition, and as such is apt to be anathema to scientists, with their insistence upon objectivity and quantitative measurements.

To the average person, innocent of the niceties of academic distinctions, the term well-being calls to mind a fairly definite picture. True, the concrete forms and measure of the detailed items comprising this picture vary considerably in the minds of different individuals, but, in the last analysis, most, if not all, of the circumstances constituting our concept of well-being center about three main conditions. These are: first, adequacy of income; second, condition of bodily health; and third, state of mind.

In the judgment of the common man, and this includes most of us, any individual or family having an income adequate to the needs they consider imperative, and enjoying good health and a normal peace of mind, will be considered in a state of well-being. This much may at least be said without fear of successful contradiction, that these three factors, if not actually the constituent elements of well-being, form at least the bases of such a condition.

The term social well-being, used in the title of, and throughout, this volume, is employed in the accustomed and ordinary sense of those words—to indicate the condition of a society whose individual members are in a state of well-being. Society has no existence apart from the individuals composing it, and the concept of social well-being has no meaning other than as a reference, collectively, to the state of being of its several members.

The bases of social well-being are, therefore, identical with those of individual well-being. These bases have been referred to as adequacy of income, condition of bodily health, and state of mind. The problems connected with these three bases constitute the major part of this volume, and will be discussed under the headings of: (1) Problems of Income; (2) Problems of Health, and (3) Problems of Mental Hygiene.

THE LACK OF SOCIAL WELL-BEING

Whatever shades of distinction there may be concerning the meaning of well-being, individual and social, it is comparatively easy to agree as to what it is not. Certainly there can be little difference of opinion as to the very poor, the sick, the feeble-minded, or the insane. These manifestly are not in a state of well-being, nor is their presence in society productive of social well-being, within the limits of any meaning which can be given reasonably to that term. Many concrete forms and degrees of human misfortune and need will suggest themselves to the reader; whatever else may be said concerning them, it will be agreed that they have in common an obvious and distinct lack of well-being.

With the development of the social sciences and the objective study of the various groups to which we have just referred, there has been emphasized repeatedly the need for some apt blanket phrase or term to designate them *in toto* or to indicate their common condition. Some years ago, the alliterative phrase, "defective, dependent, and delinquent classes" became, by common consent, a sort of scrap-basket title used to include all persons who were not in the last

analysis to be rated as effective and self-directive members of the community. Gradually, however, dissatisfaction with the term developed until now persons dealing with such individuals are inclined to smile when the long trinomial is mentioned, and the "three D's" are rapidly dropping out of the text-books as well as convention, institution, and social reports. The chief objection has been that the phrase was too enumerative for a general title and not enumerative and expressive enough to denote the component elements.

"All students of social structure agree that a general non-enumerative title is needed to designate all of those classes in modern society which need special care, restraint, or direction, who as a group do not contribute in net to the general welfare (nor at all except as they may awaken altruistic conduct in their more fortunate fellows), but who, on the contrary, in net entail a drag upon those members of the community who have sufficient insight, initiative, competency, physical strength, and social instincts to enable them to live effective lives without particular social custody. The general titles suggested for this great division of humanity are the following: anti-social classes; asthenic classes; classes in need of social care, control, or correction; defectively socialized classes; dependent classes; exceptional classes; incompletely socialized classes; public charges; social debtor classes; social debtors; socially handicapped classes; social maladjustments—*i.e.*, the socially maladjusted classes; socially abnormal classes; socially unadapted; socially unfortunate; sub-social classes; subnormal classes; unsocial classes; unusual classes; and the lower or submerged tenth."[1]

Most, if not all, of these terms are used in the current literature. Each of them has some merit and its own advocates. Recognition of this problem of terminology is made here, with no attempt at or pretense of its solution. For the purpose of this volume, there would seem to be no particular objection to the use of any or all of them.

It does seem necessary, however, to find some phrase to

[1] Laughlin, H. H., "The Socially Inadequate: How Shall We Designate and Sort Them?" *American Journal of Sociology*, July, 1921.

indicate, and to use instead of, "the lack of well-being." With apologies for making any selection which would savor of adding to an already abundant nomenclature, it is hoped that the term ill-being will meet with approval. At any rate, it will be used throughout this volume. In so doing, no claim is made to originality or superior value. It must be confessed that it is vague, somewhat indefinite, and not entirely logical, but it does seem to involve a concept easy to grasp and generally familiar, and it has the distinct merit of brevity—in other words, of including in a short, understandable term the common condition of those various groups in society which are obviously not in a state of well-being.

THE EXTENT OF SOCIAL ILL-BEING IN THE UNITED STATES

Statistical studies of certain groups, such as the insane, feeble-minded, paupers, inebriates, diseased, blind, deaf, deformed, etc., have been made from time to time, and on the basis of these and other data it has been a common practice in this country in years gone by to speak of "the submerged tenth," the implication being that these obvious types of ill-being *in toto* constituted 10 per cent of the population.

The extent of social ill-being is far greater, however, than the sum total of such enumerations would indicate, for the figure thus obtained (whether this equals one-tenth of the entire population is still another question) would but show, in large measure at least, those which at a particular time are being recognized or dealt with by existing resources. It has happened a number of times that some part of the country, with no provisions for the care of some definite pathological group, seemed to show at first glance an insignificant number of persons needing such care, but that subsequently, with the development of facilities, a surprisingly large number of legitimate cases of such need appeared. The number of feeble-minded in institutions, for example, would be doubled undoubtedly within ten years if there was during that period a corresponding increase in facilities for their care. This would tell us nothing, however, about the number or increase of such persons in society. It would be simply a measure of a change

in the public's conception of its duties and responsibilities in regard to this particular group. Such facts are the commonplace of our social experience.

Another highly significant fact in connection with any attempt to estimate the extent of social ill-being is that poverty, pauperism, insanity, feeble-mindedness, and the like, are relative terms. They involve the concept of social standards, which means that the number of persons designated as falling within any of the above-named categories is likely to vary as the standard involved changes. A rise of standards in regard to any of these groups, all other factors remaining equal, increases automatically and proportionately the relative size of that group, and *vice versa*. It is particularly important to remember this in a period characterized, like the present one, by marked changes of social work standards.

What has just been said must not be interpreted to mean that social ill-being is an inevitable cost and evidence of social progress. The fact is not that a rise in social standards must increase the relative amount of social ill-being, but that it usually does. A rise in standards and a decline in the number of those who fail to measure up to it are not incompatible. An example will suffice to make this clear. If a school with a passing grade of 70 suddenly changes to one of 85, all other factors remaining equal, there will be an appreciable increase in the number of students failing of promotion. The important fact in this connection, however, is that it is not necessary for all other factors to remain equal. This is too often lost sight of. Accompanying the revision of the passing grade may be various measures minimizing or removing conditions unfavorable for a quality of work such as the students are capable of doing. As a result, there may be a reduction in the number of failures below that which existed before the passing grade was raised.

It is so in human society. An increase in the extent and complexity of social ill-being should be interpreted, therefore, not so much as "costs of progress" as "costs" of the "failure of social invention and social arrangements to keep pace with the exploitation of Nature, with economic organi-

zation, and with the development of individual initiative." [1] Life, in the last half century, has increased rapidly in complexity; social standards and requirements have risen correspondingly. To the extent that these developments have not been paralleled by rational and effective efforts to remove removable causes of maladjustment; or, as Ogburn puts it,[2] to the extent that the adaptive culture has not kept pace with the material culture, the amount of social ill-being has increased relatively.

It ought to be clear by this time why specific figures as to the extent of different kinds of social ill-being, which are common in popular literature, are used with considerable caution by careful students, since they realize how inadequate and misleading such data are. The statistical summaries that follow herewith are made, therefore, with due recognition and warning of their tentative nature. The conclusions cited are for the main kinds of ill-being, as discussed throughout this volume. In each case, the justifying data will be presented and analyzed in subsequent chapters.

At least 15 per cent of our population have lived, in recent years, at the poverty level. The number of persons seriously ill at any one time in this country approaches 3 per cent; an equal number, while not seriously ill, are handicapped appreciably by lack of health—a total rate of non-effectiveness due to ill-health, of between 5 and 6 per cent of the population. Approximately 25,000 permanent disabilities and some 600,000 serious injuries in American industry annually constitute, in accumulation, another appreciable element. Among the many persons of low intelligence among us, at least a half million are in need of institutional care. More than a quarter of a million are in hospitals for the mentally sick; more than a half million would be, if institutional facilities were available. This bare enumeration is enough to indicate a distinct lack of well-being in a considerable proportion of the population of the United States.

[1] Gillin, John L., *Poverty and Dependency*, The Century Company, 1922, pp. 3-4.

[2] Ogburn, W. F., *Social Change*, B. W. Huebsch, New York, 1923.

WHAT THE LACK OF SOCIAL WELL-BEING COSTS

The concept of cost, to most persons, involves the idea of money. The most obvious, as well as the most tangible, item in the cost of social ill-being is the amount of money expended annually by the agencies devoted to their care or dealing with problems connected with their presence in society. This amount, for the entire United States, on the basis of the best data now available, comes reasonably close to the two-billion-dollar mark.

Justification for a conclusion involving such a staggering annual outlay will be found in the various studies which have been made recently in this field. A few of these will be summarized briefly. Douglas and Joslyn, after a comprehensive survey, estimated the total national charities' budget (1920) at 1,700 million.[1] Procter and Schuck, after calling attention to the striking "overnight" development and present scope of private services, conclude that they now (1926) involve "an annual outlay for both current operation and capital outlay of approximately $1,000,000,000." [2] William J. Norton, after citing some fragmentary evidence, concluded (1923) that the holdings of *private* social work organizations in the United States run close to two and a half or three billion dollars, and that the annual cost of such work is not far from three-fourths of a billion dollars.[3] If, in a consideration of these analyses, allowance be made for unorganized and untabulated giving, and for that " body of municipal, state and federal government welfare enterprises sprawling across the continent in a giant and constantly growing network," [4] it will be appreciated that 2 billions is entirely within the realm of reason and of probability.

Further support for our conclusion may be obtained by taking the figures obtained in local or restricted areas and pro-

[1] Douglas, Paul and Dorothy, and Joslyn, Carl in *The American Economic Review,* vol. XI, No. 4, Supplement 2, December 1921.

[2] Procter, Arthur W., and Schuck, Arthur A., *The Financing of Social Work,* A. W. Shaw Company, Chicago and New York, 1926, p. 6.

[3] Norton, W. J., "The Bill for Benevolence," *The Survey,* November 15, 1923, p. 184.

[4] Norton, *ibid.,* p. 246.

jecting them, on the basis of population, to the country at large. An excellent local study for this purpose is one made for Philadelphia in 1924 by the Welfare Federation of that city. In Philadelphia there was expended in the year 1924 a total of $27,600,000 for welfare work of all kinds. Of this amount, private agencies expended in round numbers $18,900,000, as against $8,700,000 spent by public agencies. These expenditures are divided into about ten groups and the amounts spent in each of these classifications is in round numbers as follows: For hospitals and dispensaries, $10,660,000; child-caring agencies, $5,000,000; recreation and neighborhood service, $3,375,000; mental health, $2,700,000; relief and family service, $1,270,000; extra-institutional health service and sanitation, $1,250,000; aged and adults, $1,165,000; physically handicapped, $925,000; reformation agencies, $776,000; research and social planning, $477,000. It must be remembered that these figures do not cover the work of the prisons, the police force, the fire department, the courts, or the work of the Board of Education, except as it relates to health. Moreover, these amounts deal only with the current expenses of these institutions and do not represent expenditures for buildings, extensions or capital funds, nor interest on capital expenditures by the city.[1] A projection of this figure on the basis of population to the United States results in a total of almost $1,700,000,000.

The annual reports of the Massachusetts Board of Public Welfare are favorably known for the value of the data which they present. This state, in 1921, spent $7,116,954 for public poor relief. In the same year, the incorporated private charities within the state expended $33,079,681 for similar purposes. Thus the total expenditures for the year for this purpose, excluding unincorporated private charities, exceeded forty million dollars.[2] This figure, which was solely for poor relief, if projected to the entire country, results in a total of $1,100,000,000. This is equivalent in round numbers to the amount

[1] Statement prepared by Kingsley, Sherman, *Welfare Federation,* Philadelphia.

[2] *Annual Report, Massachusetts Board of Public Welfare,* Boston, Mass., 1921.

obtained by a projection, again on the basis of population, to the United States of the total budget of the *private* social agencies of New York City, estimated (1925) at approximately $60,000,000.[1]

The annual reports of the New York State Board of Charities are of particular interest in this connection. This board has authority to maintain supervision over all public charitable institutions and also over any private institutions or agencies which are in receipt of payments from counties, cities, or towns, for the care and maintenance of inmates retained as public charges. Its annual report is one of the most complete and satisfactory of state publications. The report for the fiscal year ending June 30, 1922, includes data on 17 state institutions, 267 maintained by counties, cities, and towns, and 631 under private control, or a total of 915. In addition, there are, of course, a great many organizations maintained entirely at private expense and hence without state supervision, nor are data on prisons and institutions for the mentally diseased included.

An examination of this report shows that the total property valuation of these 915 institutions or agencies was $246,031,827, that the total maintenance expenses incurred for the year were $67,393,257, and that the total expenditures of these institutions were $88,310,207. To this amount may be added $100,000,000 which Charles H. Johnson, secretary of the Board, is quoted as saying, is the approximate annual expenditure of private charities in the State of New York, over which there is no official supervision.

It appears conservative to say, on the basis of available data, that the various well-defined kinds of social ill-being cost the state of New York in direct expenditures in the neighborhood of $200,000,000 a year. Moreover, the fact that a bond issue of $50,000,000 for the development of additional institutional facilities for this purpose was approved several years ago by the voters of the state would indicate that recent provisions have not been entirely adequate. Again projecting the above total for the state to the entire United States, it would

[1] Procter and Schuck, *op. cit.*, p. 11.

appear that from this approach direct annual expenditures for purposes of this kind approximate $2,000,000,000 a year.

Two billion dollars is a very large sum of money, even in this day of post-war budgets. It is equal substantially to two-thirds of the federal budget in 1926, and to about a fourth of the total revenue raised in recent years for municipal, county, state, and national purposes. It represents somewhat more than 3 per cent of the total income of the United States, and in excess of 10 per cent of the national surplus, after due allowance for taxes, investments, and a minimum of life.[1]

Comparative Costs of Social Ill-being and of Public Education.—Social-welfare activities compete constantly with public education in their demands upon the public treasury. There is, therefore, more than a passing point to a comparison of annual expenditures in these two fields. Over against the two-billion-dollar estimate of the total annual cost of social ill-being is a total expenditure for the maintenance of the public school system in the United States for the year 1923-4 of $1,820,743,936. To be compared with the $200,000,000 estimate for the state of New York is a public school budget in that state for 1923-4 which shows a total of $176,706,130 for current expenses, and a total of $243,455,088, if current outlays be included. Over against more than $40,000,000 expended by incorporated social-welfare agencies, both public and private, in Massachusetts, is an annual expenditure of $58,013,495 for current expenses of the public school system in 1923-4. Current outlays swell the amount to $70,107,400. Of special value, because of the accuracy of both figures, is a comparison of expenditures for these two purposes in the city of Philadelphia. The social-welfare budget has already been cited as amounting to $27,600,000 for the year 1924. The total current expenses for the maintenance of the public school system in that city in 1923-4 totaled to $21,890,201. On the basis of such comparisons, it would appear that the amount now spent annually for the care of social debtors in the United

[1] Cf. "Competency and Economy in Public Expenditures." *The Annals of the American Academy of Political and Social Science,* Vol. CXIII, No. 202, May, 1924. Also, "Costs of Government in the United States," *The National Industrial Conference Board.*

States is in close proximity to that expended for the maintenance of our boasted public school system.

A recent report on "Public Social Services," describing the total expenditures for public welfare work in Great Britain, might be referred to at this point. The expenditures accounted for are those provided under certain acts of Parliament, especially those provided under the national health insurance acts, the unemployment insurance acts, the war pension acts, the old-age pension acts, the education acts, the acts relating to reformatory and industrial schools, the inebriates acts, the public health acts (so far as they relate to hospitals, the treatment of disease, and maternity and child welfare), the housing of the working classes acts, the acts relating to the relief of the poor, the unemployed-workmen act, the lunacy acts, and the mental-deficiency act.

The total expenditures for the year 1924 were £291,638,266, or almost $1,400,000,000 in terms of our currency. Of this amount, 22.8 per cent came from local rates, 51.5 per cent from the central government *via* parliamentary votes and grants, and 25.7 per cent from insured persons and other miscellaneous income. Expenditures for poor relief, it is pointed out in the report, have more than quadrupled since 1891, the amounts for 1891 and 1924 being £8,456,017, and £37,964,000, respectively, this in spite of the growth of social insurance. During the same period the population of England and Wales increased about 30 per cent.

Social Well-being a Matter of Financial Interest.—What the lack of social well-being actually costs society in dollars and cents is, of course, far greater than an annual budget of social-welfare activities, staggering though such a budget be. Brief consideration will suggest various other items of cost, many of which can be expressed in terms of monetary units. Concrete suggestions of the nature and economic magnitude of some of these items will appear in subsequent chapters.[1]

If our estimate of $2,000,000,000 is reasonably correct, or if, perchance, it need be cut in half, and disregarding for the mo-

[1] Cf. Bower, L. F., *The Economic Waste of Sin*, The Abingdon Press, New York, 1924.

ment all other items of cost to society, it must be clear that the lack of social well-being is a problem of first magnitude to the people of the United States. An appreciation of its cost is seeping into the public consciousness and as a result some rather pointed questions are being asked. Is this money spent wisely and judiciously? Must such stupendous expenditures continue indefinitely? Are there no ways in which the burden may be lightened? Is it not possible for constructive social measures to reduce the number of such persons? Shall the economy of the future be that of neglect or of prevention? Leaders in the field of social welfare are coming slowly to appreciate the effectiveness of thus touching the business sense of the people. If sentimental appeals were sufficient, these problems would have been dealt with adequately long ago. In a world of rational beings, intelligence would suffice. But taking the world as it is, it seems that men must be touched at their most sensitive spot, their financial self-interest, before they will be moved to give serious attention to such problems.

It is quite unnecessary to emphasize the fact that the financial aspect of the cost of social ill-being, though the most tangible, is by no means the only one. These other items, however, are difficult, if not impossible, to measure. No method that has yet been devised can translate the suffering, the unhappiness, and the anxiety of these unfortunates into statistical units. Furthermore, what these people might have become, what, under happier circumstances, they would perchance have contributed to society, is a story of what might have been. And such a story the poet has pronounced of incomparable sadness.

THE WEB OF LIFE [1]

Charles Darwin's delightful exposition of the connection between cats and clover—how red clover is fertilized by humblebees; how the number of humblebees in any district depends upon the number of field mice, which destroy their combs and

[1] THOMSON, J. ARTHUR. *Darwinism and Human Life,* Henry Holt & Company, New York, 1911, Chap. II.

nests; and how the number of mice is largely dependent, as every one knows, on the number of cats—has become familiar to students of science all over the world. This is but one of many striking instances which might be cited of that interrelationship of all living things which has so impressed naturalists everywhere.

This fact of interrelationship can best be illustrated in the case of our own selves. "In thinking of a living body we are accustomed to the idea of the correlation of organs. It is of the very nature of an organism that there should be mutual dependence among its parts. The organs are all partners in the business of life, and if one member changes others also are affected. This is especially true of certain organs that have developed and evolved together, and are knit by close physiological bonds. We know in health how nerve and muscle, brain and sense-organs, heart and lungs, are closely bound together in the bundle of life. We know in disease that a change in one organ often affects another, and the fact remains, though the nexus is sometimes mysterious. The state of our liver may give color to our whole intellectual firmament, and a slight ocular derangement may warp a wise man's philosophy. The far-reaching importance of a little organ like the thyroid gland beside the larynx is well-known; our intellectual as well as our bodily health depends on its soundness. Now, just as there is a correlation of organs within the body, so there is a correlation of organisms in that system of things which we call Nature. . . .

"We may use the metaphor 'web of life' in two ways. On the one hand, Nature has a woven pattern which science seeks to read, each science following the threads of a particular color. There are a warp and woof in this web, which to the zoölogist usually appear as 'hunger' and 'love.' There is a changing pattern in the web, becoming more complex as the ages pass; and this is evolution. But the essential idea of a web is that of interlinking and ramifying. We can never tell where a thread will lead to. If one be pulled out, many are loosened. This is true of nature through and through.

"The phrase 'web of life' suggests another picture—the

web of a spider—often an intricate system, with part delicately bound to part, so that the whole system is made one. 'The quivering fly entangled in a corner betrays itself throughout the web; often it is felt rather than seen by the lurking spinner. So in the substantial fabric of the world part is bound to part. In wind and weather, or in the business of our life, we are daily made aware of results whose first conditions are very remote; and chains of influence, not difficult to demonstrate, link man to beast, and flower to insect. The more we know of our surroundings the more we realize that nature is a vast system of linkages, that isolation is impossible.' " [1]

These two aspects of the inter-relationship of life have direct application in our study of social well-being. In the first place, our data are inconceivably complex, our factors inextricably interwoven. Income, physical welfare, and mental hygiene make definite categories for the writing of a book, convenient for the organization and presentation of material, but the problems of life, it must not be forgotten, do not classify themselves so arbitrarily. Every person, each family, represents a composite of standard of living, income, health, personality, etc., all constantly interacting. Ceaselessly, on the Cosmic Loom, Life shuttles back and forth, weaving curiously differing strands into strangely differing fabrics. We follow, now one, now another, thread of a particular color, but "we can never tell where a thread will lead to."

The phrase "web of life" seems also to suggest to us the web-like character of society itself; how intricate the social structure is, "with part delicately bound to part, so that the whole system is made one." The term "social organism" may be but an analogy, and not in good repute among members of the sociological guild, but it is remarkably indicative of the facts. Although the interdependence in society has been emphasized usually on the structural or functional side, it is just as true and equally significant in regard to the differing conditions of the constituent groups in society. Society is made up of many classes and conditions of men, all inter-related in subtly diverse ways. We are all passengers on board the

[1] THOMSON, *op. cit.*, pp. 45-47.

"Good Ship Earth." Our lives, our fortunes, and our well-being cannot be dissociated from those of the other passengers.

Moreover, this is true, increasingly. A century of unparalleled progress has made us—inconceivably interdependent. As Ely has pointed out, "progress is a passage from independence to dependence, from distrust to confidence, from hostility to amity, from helplessness to helpfulness, while the great law of social solidarity gains ever-increasing importance." [1] It is this increasing interdependence which makes it more and more imperative for all to concern themselves with the well-being of each, and each of all.

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Part One

SOCIAL WELL-BEING AND PROBLEMS OF INCOME

CHAPTER II

INCOME AS A FACTOR IN WELL-BEING

Income is the first of the bases of well-being to be dealt with in this volume. Real income, as hereafter defined, is of primary concern to all of us. Of its basic importance as a conditioning factor in all phases of life, there can be no doubt. It is the purpose of this chapter to review some of the more important ways in which income conditions human well-being.

The subject of income has been curiously neglected in our socio-economic literature: almost in direct proportion to its importance in every-day life. Amazingly little has been written by economists on income, despite the fact that income taxation has won a firm place in the fiscal machinery of most civilized nations, and that the quest for income is the major driving force of our economic life. Similarly, in the literature of Applied Sociology, although there are some serious studies and many scattered references to the significance of income in some one or other aspect of life, there has been on the whole relatively little effort to appraise systematically and scientifically its separate importance, or to synthesize the separate items of its social importance into a general picture. To do the former must be the work of many careful researches; to do the latter is the hope of this chapter.

WHAT IS INCOME?

Before proceeding further, it is necessary to agree, at least in general terms, upon the meaning of the term income. "Economists have found income difficult to define. Professor Irving Fisher, in his book on *The Nature of Capital and Income,* published as late as 1906, characterizes economic opinion regarding the nature of income as 'deplorably confusing and conflicting.' Professor Seligmann, writing in 1911, said: 'The problem of defining income . . . is one that almost baffles

the student.' Still more recently, in 1921, the staff of the National Bureau of Economic Research said, with reference to income statistics, that 'one of the most serious difficulties in working with these data is the difficulty of definition,' and supported that statement by propounding a long series of unanswered riddles concerning income." [1] In other words, here is another of those problems of terminology with which the social sciences abound, that of finding a term useful for scientific analysis, yet harmonizing with popular usage.

Income is usually interpreted in terms of money, of "money receipts accruing through a period of time. . . . While for many purposes the concept of money income is sufficient as a working tool, a little reflection will show that it does not reach very far below the surface of economic activity. Money is desired not for itself, but for what it will buy in the markets of the world. Men seek it that they may acquire food, clothing, shelter, and some of the luxuries of life. The real income consists of those commodities and services that will satisfy the wants of men. Money income is sought after, that real income may be obtained and enjoyed." [2] "Net individual income is the flow of commodities and services accruing to an individual through a period of time and available for disposition after deducting the necessary cost of acquisition." [3]

INCOME AND PHYSICAL WELL-BEING

Income and Natal Conditions.—Income conditions our advent into the world. "It is now realized that a large proportion of the deaths of babies occur in the first days and weeks of life, and that these deaths can be prevented only through proper care of the mother before and at the birth of her baby. It is also realized that breast feeding through the greater part of the first year of the baby's life is the chief protection from all diseases, and that mothers are much more likely to be able

[1] Plehn, Carl C., "The Concept of Income, As Recurrent, Consumable, Receipts," *American Economic Review,* March, 1924, pp. 1-12.

[2] Hewett, W. W., *The Definition of Income and Its Application in Federal Taxation,* Westbrook Publishing Company, Philadelphia, 1925, p. 11.

[3] *Ibid,* pp. 22-23.

to nurse their babies successfully if they receive proper care before, at, and after childbirth." [1]

"The expectant mother should at once consult a physician. She should remain under supervision, so that any dangerous symptom may be discovered as soon as it appears. She should learn how to take care of herself, and she should have proper food and rest and freedom from anxiety. When the baby is born the mother needs trained attendance. A difficult maternity case is one of the gravest surgical emergencies. Many people do not seem to understand that in any case complications may arise which can be met safely by prompt and skillful scientific care, but which at the hands of an unskilled attendant may cost the life of mother or child or both. Even after confinement the mother needs continued supervision and rest until her strength has returned." [2]

A person must be very naïve who fails to see that thousands of mothers and children cannot have the essentials of safety at this critical period, wholly or in part, because of inadequate income; one must have very little ability to think things through who does not realize that if these natal (including pre-and post-) factors are potent enough to cause death, they must necessarily carry many serious non-fatal consequences in their wake.

Income and Infant Mortality.—Being an infant is a dangerous occupation. A baby who comes into the world has less chance to live a week than a person ninety years old, and less chance to live a year than one of eighty years of age. The chances which any individual child has of surviving this hazardous period of infancy can now be determined with scientific approximation on the basis of the father's earnings.

In its studies of infant mortality in seven widely differing cities, involving careful data on 21,536 live-born infants, the Federal Children's Bureau has established definitely the relationship between earnings of fathers and the infant mortality rate. The following summary, showing the variation on the

[1] "Maternal Mortality, *U. S. Children's Bureau,* Government Printing Office, Washington, 1917, Bureau Publication No. 19, p. 9.

[2] "Saving Mothers," *U. S. Children's Bureau,* 1917.

basis of earnings of fathers, is taken from a table by Woodbury, formerly director of Statistical Research of the Bureau.[1]

Earnings of Father	*Infant Mortality Rate*
Under $ 450	166.9
$ 450–$ 549	125.6
550– 649	116.6
650– 849	107.5
850– 1,049	82.8
1,050– 1,249	64.0
1,250 and over	59.1

"To summarize, in this group of legitimate city births a marked correlation was found between low earnings of father and high infant mortality. Low earnings of the father were found to correspond to high economic pressure as measured by the per capita amount of earnings available for each member of the family. This relationship between earnings and mortality was found to be independent of type of feeding, of race and nationality, and of the factors involved in frequency of births. The conclusion may be drawn, therefore, that economic pressure due to low father's earnings is a causal factor in the infant death rate.

"The influence of economic position is undoubtedly indirect. The study of the chain of causation connecting poverty with high infant mortality showed that the responsibility of low earnings extended over the excessive mortality associated with housing congestion and with the mother's employment both during pregnancy and during her child's first year of life. It showed also that a direct relation existed between lack of means and the kind of care available both for the mother during pregnancy and confinement and for the baby during his first year." [2]

Income and Nutrition.—When the subject of malnutrition first received serious attention, several decades ago, it was assumed that the problem was one of underfeeding due to poverty. To this day, poverty and malnutrition are used almost

[1] Woodbury, R. M., *Infant Mortality and Its Causes,* The Williams and Wilkins Company, Baltimore, 1926, p. 131.

[2] *Ibid.,* p. 151.

synonymously in British reports dealing with the subject, and there is a considerable body of fact in Great Britain's experience to emphasize the close connection between the two. American experience, on the other hand, seemed to show as time went on that there was some considerable undernutrition not confined to the poor. Indeed, certain students of the problem in the United States have gone so far as to attach little or no importance to poverty as a factor.[1]

"That poverty is not the sole cause of malnutrition no experienced worker would today deny; yet many believe that the pendulum has swung too far in the direction of discrediting poverty. The general public has been all too ready to accept this doctrine, for it is a comfortable one which relieves them of all economic responsibility." [2] It is not unlikely, too, that some confused thinking on this subject has resulted from a failure to distinguish between the direct and the indirect results of inadequate income. It is certainly true, as Emerson has shown [3] that naso-pharyngeal obstructions, health habits, and defective home control present problems which no effective campaign against malnutrition dare overlook, but it is equally true that the presence of these factors is due in many cases and in varying degrees to insufficient income. Ignorance of food values exists among rich and poor, but the financial margin of the former furnishes a defense which the latter unfortunately do not have. "It is clear," as Miss Lathrop abruptly puts it, "that poverty takes away the defenses by which the effects of ignorance may be evaded." [4]

"There is a certain level below which not all the knowledge in the world could purchase an adequate diet. What this level is depends on the locality and the current prices at any given time. There are plenty of families today with incomes below this mere subsistence line, and any social worker knows where the budget of such a family suffers. Rent must be paid

[1] Emerson, W. R. P., *Nutrition and Growth of Children*, D. Appleton & Company, New York, 1922.

[2] Roberts, Lydia, J., *Nutrition Work With Children*, The University of Chicago Press, Chicago, 1927, p. 132.

[3] *Op. cit.*

[4] Quoted from Roberts, *op. cit.*, p. 133.

in order that the family be housed. A minimum of clothes must be provided for the father and the children so that they may go to work and to school. The only place to cut is on the food, and there the cut comes with the consequent under nutrition of the family. Gebhart points out some of the unfortunate ways in which poverty affects the purchases and food habits of these families. One such habit is that of preparing meals chiefly for the father, the bread-winner, and giving the children 'pieces' or left-overs during the day to stay their hunger until the father comes home at night. This custom in itself tends to poor nutrition, for the 'pieces,' however many in number, do not usually furnish either the right constituents or a sufficient amount. A second habit is the tendency to regard certain foods as luxuries and to discontinue their use when they reach a certain price. This was strikingly demonstrated in a study made by Miss Lucy Gillett in 1917 to discover the effect of the rise in the prices of milk from nine to fourteen cents a quart on 2,100 families in the poorest district of New York City. Although these families were using only about half their estimated needs, 70 per cent of them still further reduced their already inadequate amounts, and 1,213 families were substituting coffee and tea. Some other adjustment in the expenditure would no doubt have been a wiser procedure; yet the fact remains that this is what invariably happens, and that vegetables and fruits suffer a like reduction when the price is high or the income low, for, like milk, they are regarded as luxuries and used accordingly." [1]

The relation between income and some of the more important dietary factors is strikingly shown in a study of 6,000 pre-school children in Gary, Indiana, made by the Federal Children's Bureau.[2] In that investigation it was found that income is a responsible factor, though not the only one, for the lack of such important dietary factors as milk, eggs, potatoes, vegetables, fruit, and cereals, as well as for the presence of coffee and tea.

Income and Physical Development.—Income conditions

[1] Roberts, *op. cit.*, p. 133.
[2] Publication No. 122.

physical development. To say this is but to carry the relationship established in the preceding section to the next logical step. Nutrition is correlated with physical development quite as clearly as income is correlated with nutrition; consequently, if income affected physical development only through nutrition, its importance as a conditioning factor would be quite clear. As a matter of actual fact, income influences, in some way or other, every extrinsic or environmental determinant of physical development.

Height and weight standards seem to offer the best objective measure of physical development. The pioneering work of Bowditch, Peckham, and Porter; the latter studies of Boas, Barnes, West, Christopher, and Smedley; and the more recent researches of Baldwin—all have noted the tendency of children in the more prosperous localities to be taller and heavier than those of the same age in poorer sections.[1] From abroad comes similar evidence. Greenwood's study of more than seventy thousand children in Glasgow between the ages of five and eighteen years compares their height and weight on the basis of four income groups. He found weights in the lowest group to be 6 to 11 per cent less, and heights 4 to 6 per cent less, than those in the highest income group.[2]

It must not be assumed that the chain of causation between income, nutrition and physical development is always obvious and direct. In a very careful and painstaking investigation of "Poverty, Nutrition and Growth," recently completed by Drs. Noel Paton and Leonard Findlay and a group of associates under the Medical Research Council of Great Britain, it is pointed out that on the basis of the data gathered in the three largest Scotch cities and in agricultural and mining regions of Scotland, there is little evidence of a *direct relation* between the size or nutrition of the child and the income of the family per person. Emphasis is placed in the report upon "maternal efficiency" as the outstanding factor affecting the physical development of these Scotch children. This, of

[1] Baldwin, B. T., "The Physical Growth of Children from Birth to Maturity." *University of Iowa Studies in Child Welfare*, Vol. I, Iowa City, June 1, 1921, No. 1; and Roberts, L. J., *op. cit.*, Chap. 4.

[2] *Ibid.*, p. 136.

course, would seem to be but another way of saying that the relationship between income and physical development may be indirect, and that it is modifiable by other factors.

Income and Health.—Significant relations between low wages and sickness were found by the United States Public Health Service, in a study made in 1916 in seven South Carolina mill villages. The following table shows the number of cases of disabling sickness and the rate per 1,000, during May and June, 1916, classified according to income.[1]

ALL PERSONS

Half-Month Family Income per Adult Male Unit	Number of Persons Considered	Sick Persons	
		Number	Per 1,000 Persons Considered
Less than $6	1,312	92	70.1
$6 to $7.99	1,038	50	48.2
$8 to $9.99	784	27	34.4
$10 and over	1,027	19	18.5
All incomes	4,161	188	45.2

Three conclusions, of considerable significance in this connection, were drawn on the basis of the entire investigation: first, that a higher sickness (involving inability to work) rate and a greater amount of working time lost on account of such sickness were found among members of families whose incomes were low than among members of families with a more favorable economic status; second, that low economic status appeared to be a more striking concomitant of high sickness rate among females than employment in millwork; and third, that a greater proportion of disabling illness, of relatively long duration, appeared among persons whose family income was

[1] Sydenstricker, E., Wheeler, G. A., and Goldberger, J., "Disabling Sickness Among the Population of Seven Cotton-mill Villages, etc.," *U. S. Public Health Reports,* Vol. XXXIII, No. 47, November, 1918.

below the average than among persons with a more favorable economic status.

This summary is substantiated by the evidence from other sources. Physical examinations of garment workers in the cloak, suit, and skirt industry in New York City in 1914 showed that while no vocational diseases peculiar to garment workers were found, the condition clearly suggested that the largest number of anemic tuberculous workers in an extremely seasonal industry were found in that group composed of the lowest paid and the least regularly employed.[1] Studies of many particular diseases allude to the influence of economic status. Tuberculosis, to cite an obvious case, has been decidedly more frequent among the poor than the rich. Virtually no pellagra exists except among the markedly poor.

The relation between income and the infant mortality rate has been alluded to. The correlation of the general death rate with the infant mortality rate is about 0.8, and the health and disease rate is closely correlated with the death rate. There is some justification, then, for the suggestion of a new nomenclature, and to speak of low earnings as a dying rather than a living wage.

The relation between sickness and inadequate income is but a negative aspect of the central idea to be emphasized here—*viz.,* that income affects health in many ways, both directly and indirectly. Income conditions nutrition, and the importance of nutrition as a factor for positive health, as a therapeutic agent in disease, and in relation to susceptibility toward disease, all are being recognized increasingly. Income determines in large measure the consumption of clothing, and the effect of clothes upon health, while often indirect and at times subtle, is considerable. It is not unlikely that inadequate clothes may have more to do with the increase of heart diseases than has been usually supposed. Then, too, income influences housing, and no one would deny at least some relation between housing and health. Income affects health very directly in respect to the amount, promptness, and quality of

[1] Warren, B. S., and Sydenstricker, E., "The Health of Garment Workers," *U. S. Public Health Reports,* May, 1916.

medical service which it prescribes. Inadequate income and inadequate medical attention stalk hand in hand the world over, leaving a path of needless devastation in their wake. Income determines, in part, at least, the margin of safety during convalescence. An extra day, week, or month of rest after an exhausting illness or critical operation is very important for the welfare of the patient, and quite economical in the long run. But, and ofttimes unfortunately, the long run of life is complicated by the short run of income.

INCOME IN RELATION TO OUR MENTAL LIFE

The relationship between income and mental life is a relatively unexplored field; one finds here none of the quantitative studies such as it was possible to present in summary on the physical side. Progress in determining the significance of income in this connection is fraught with numerous difficulties. The data are not easy to measure objectively. Moreover, psychological effects are apt to be indirect and subtly veiled, perhaps so in direct ratio to their importance. The mind, we are coming to learn, is a cunning thing. Self-deception undoubtedly exceeds all other forms of delusion. The following discussion must be suggestive, therefore, leaving to future researches the proper identification and measurement of the influences of income in mental life.

Income and Mental Development.—Mental capacity is thought of usually as an hereditary endowment, developing independently of environing circumstances. Yet all of our recent emphasis upon mind as but one aspect of, instead of independent of, the organism cannot but carry the implication that what affects the general development of the organism affects of necessity its mental development. Tredgold has long since emphasized this point. He says: "However good the inherent potentiality, it is clear that development cannot take place to the full in the absence of a food supply which is adequate in quantity and quality; and consequently under such adverse conditions it is by no means uncommon to find considerable mental retardation. Such cases may simulate amentia so closely as to make a diagnosis impossible at the

time." [1] Blanton found marked mental and nervous changes in German children caused by under-nutrition.[2] Healy, in his work with juvenile delinquents, emphasizes the mental dullness which results from physical conditions.[3]

"The depressing effects of malnutrition on the mental powers," concludes Roberts, "are then undoubted. This does not mean, however, as has been repeatedly shown in the foregoing—that malnutrition always causes feeble-mindedness or even a failure to do creditable work in the school classes; nor does it indicate that all backwardness in school can be cured by remedying malnutrition. The hereditary mental endowment of the individual is the largest determining factor in his mentality. It is unquestionably true, however, that a child may be mentally inferior to what he should be because of malnutrition. One cannot, it is true, promise the mother of a backward, undernourished child that improving his nutrition will cause him to do good school work; but one can say that the chances are great that he may do better than he now does. It is impossible, in short, to explain the difference between the mentality of two individuals or even of small groups solely on the basis of nutrition, owing to the far greater variable of native ability; but it is safe to say, in the words of Smedley already quoted, 'that one is likely to attain his highest mental endowment only as he reaches the growth and development which nature has marked out for him.' To do this requires, as Smedley also suggests, the provision of 'the best conditions of food, shelter, and immunity from disease.' " [4] Since income so materially affects the "conditions of food, shelter, and immunity from disease," at least some relation to mental development must be accredited.

Income and Mental Training.—Whatever excuses may be given, the one outstanding reason why children leave school as soon as they become of working age is the economic status of

[1] Tredgold, A. F., *Mental Deficiency,* Wood & Company, New York, 1922, p. 325.

[2] Blanton, S., in *Mental Hygiene,* July, 1919.

[3] Healy, Wm., *The Individual Delinquent,* Little, Brown & Company, Boston, 1915, Chap. XVIII.

[4] Roberts, *op. cit.,* p. 170.

their parents or guardians. There are those who will object to such a sweeping assertion. There is likely to be less objection, however, if it is remembered that it is the attitude which a family takes toward its economic status, and not the judgment of others, that determines their decision in such a matter. If the parents or the children themselves or both believe that their economic circumstances do not warrant a continuance of the school career beyond its legal requirements, they will act accordingly, regardless of what others with different measures of value and of income adequacy might conclude. The following statistical study shows how the earnings of the father will limit the educational opportunities of the children:[1]

GRADE COMPLETED BY CHILDREN WHO HAD LEFT SCHOOL
Per Cent Reporting Specified Grade Completed

Earnings of Father	Second and Under	Third	Fourth	Fifth	Sixth	Seventh	Eighth and Over
Total per cent.....	1.5	6.0	15.2	18.7	27.1	14.1	17.4
No earnings, or less than $850.....	2.7	6.5	18.0	19.7	27.9	11.6	13.6
$850, less than $1,250.	1.0	5.7	14.2	19.7	31.2	13.7	14.5
$1,250, less than $1,850	1.5	4.4	12.1	13.3	23.6	20.4	24.8

Income and the Attitude Toward Self.—Income, especially such as accrues from service rather than from property sources, is a measure, by and large, of the value accorded us on life's market. Can this, whether it be an altogether fair measure or no, do other than influence our attitude toward ourselves and our conception of our abilities and our future possibilities?

A good deal has been said and written about the poverty handicaps and depressing circumstances in the early background of eminently successful men. It is not to be denied that greatness has been nursed at times at the "sad and loving breast of poverty," and that there are among those "who nave climbed highest on the shining ladder of fame" some who commenced at the lowest rung. Less likely to be recognized, how-

[1] *Children's Bureau, op. cit.,* Publication No. 106, p. 44.

ever, are the wasteful character of such a winnowing process and the fact that the very exceptional nature of these cases is the justification for their telling. Mostly there results from a comparatively low rate of earnings a lessened self-respect, a feeling of inferiority, a sense of impotence and futility, and a fear of the future that bodes but added failure.

An eight-dollar-a-week wage does not make for conspicuous self-esteem in a twenty-dollar-a-week age. A good deal of the drunkenness associated with low income, especially in former days, has grown out of a deep-seated longing to regain, even if but temporarily, a self-respect, a self-confidence, and a roseate outlook upon life, otherwise denied. Ambition, it is argued, should be made of sterner stuff; but most generally it is not.

It is unfortunate that not more employers realize the stimulating effects of a rise in the standard of living of their employees. Because they do not vision the incentives which higher wages and larger possibilities bring to workers with normal desires, such employers experience only the inefficiency and lethargy that result from the absence of these incentives. Of a truth may it be said that nothing succeeds like success; nothing fails like the lack of it.

Income and the Attitude Toward Others.—Only the abnormal delight in the consciousness of defeat. Only the few can honestly face it. As for the rest, rationalization offers a comforting respite. By rationalization is meant that "process of self-deception in which the individual conceals the real foundation of his thought by a series of adventitious props." [1] Perhaps the commonest example of rationalization is the "defense reaction" by which we excuse or justify our failures to ourselves, either on the basis of the impossibility of the task or the unfairness of the test or both.

The psychology of the depressed classes in society offers a field of study so fruitful that the tardy recognition of its importance is quite astounding. The full significance in this connection of the newer developments in psychology is still

[1] HART, B., *The Psychology of Insanity*, Cambridge University Press, London, 1918, p. 65.

far from adequate appreciation. Many careful researches need to be made in this direction in the future. Meanwhile, certain obvious inferences may be suggested at this point.

It is apparent, to begin with, that the inability to meet the standard of living of one's group leads in the case of many persons to a process of rationalization which minimizes or negates entirely the desirability of maintaining its standards. Just as the student who cannot pass a course attempts to retain his self-esteem by denying its worth, so the individual who cannot live so well as his fellows is prone, for like reasons, to reject the propriety of their standards. Ultimately, there may crystallize out of such sequence of thought, either the resignation of despair or an inciting sense of resentment against the injustices of life. Neither is desirable; both lead to unwelcome consequences. The former is apt to result in that lack of application which spells defeat; the latter, to incite to that misdirection of energy which means crime.

Income and Crime.—The line of thought we are pursuing leads, of course, to the problem of the relation of income (economic conditions) to crime. This is an important question, the many aspects of which are discussed in the literature of modern criminology, to which the reader is referred.[1] It would take us too far afield to enter into this discussion at any length; sufficient is an emphasis of one or two salient points.

There can be little doubt that there is a definite correlation between economic conditions and crime, and that the former affect the latter in many ways. Sutherland says: "Poverty in the modern city generally means segregation in low-rent sections, where people are isolated from many of the cultural influences and forced into contact with many of the degrading influences. Poverty generally means a low status, with little to lose, little to respect, little to be proud of, little to sustain efforts to improve. It generally means bad housing conditions, lack of sanitation in the vicinity, and lack of attractive community institutions. It generally means both parents away

[1] Bonger, W. A., *Criminality and Economic Conditions*, Little, Brown & Company, Boston, 1916. Gillin, J. L., *Criminology and Penology*, The Century Company, New York, 1926, Chap. X. Sutherland, E. H., *Criminology*, J. B. Lippincott Company, Philadelphia, 1924, Chap. VIII.

from home for long hours, with the fatigue, lack of control of children, and irritation that go with these. It generally means withdrawal of the child from school at an early age and the beginning of mechanical labor, with weakening of the home control, the development of anti-social grudges, and lack of cultural contacts. Poverty, together with the display of wealth in shop windows, streets, and picture shows, generally means envy and hatred of the rich and the feeling of missing much in life, because of the lack of satisfaction of the fundamental wishes. Poverty seldom forces people to steal or become prostitutes in order to escape starvation. It produces its effect most frequently on the attitudes, rather than on the organism. But it is surprising how many poor people are not made delinquents rather than how many are made delinquents." [1]

It is just this effect which inadequate income has upon the attitudes of people which is to be emphasized here. Healy, in his epoch-making studies of delinquency, has pointed out repeatedly that the various analysis of exterior conditions or physical states or personal habits which have been made, or are being made, of delinquents are not to the point if they are not interpreted in relation to actual causation of the delinquent's misbehavior. Nothing is more striking to the careful student than the fact that reactions between personality and living conditions are not fixed and are not *a priori* predictable. Poverty, in one case a stimulus to formation of fine character tendencies, is in another case the motivation of even major crimes.[2]

Crime is, as Thomas expresses it, the result of an attitude and a value. All conduct emanates directly from mental life. Immediately back of an action is an idea, or wish, or impulse which exists as mental content. The scientific study of social behavior stands foursquare upon this fundamental fact. This is the essence of our newer understanding of crime, based on the researches of psychiatry. It is on the basis of this newer understanding that the relation of inadequate income to crim-

[1] Sutherland, *op. cit.*, pp. 169.

[2] Healy, Wm., "The Practical Value of Scientific Study of Delinquents," Publications, *U. S. Children's Bureau*, No. 96, p. 16.

inality takes on a new meaning. Probably the outstanding effect of inadequate income will be found to be its influence upon the attitude and values of the offender, such causal connection always remaining, however, an individual problem. The poor man, conscious of needs in his own life or in that of members of his family, witnessing at the same time the extravagance of the rich, finds himself in a frame of mind fertile with excuses for any delinquencies to which his resentment may incite. His children, denied opportunities accorded to the youth of more fortunate families, may compensate through that conspicuous behavior which is delinquency. Such at least is the testimony now coming from the child guidance clinics. The researches of present-day psychiatry are constantly throwing new light on the relation between income distribution and mental attitudes, so that ultimately it may be possible to determine a quite definite correlation.

"Justice and the Poor."—What has been said must not be interpreted in any way to mean that the sense of injustice which rankles so frequently among the poor is unfounded. To be peer is to be relatively helpless, and helplessness ever invites exploitation. One of the outstanding handicaps of inadequate income is the denial of justice.

"The administration of American justice is not impartial; the rich and poor do not stand on an equality before the law, the traditional method of providing justice has operated to close the doors of the courts to the poor, and has caused a gross denial of justice in all parts of the country to millions of persons. . . . Because law is all-embracing, the denial of its protection means the destruction of homes through illegal foreclosures, the loss through trick or chicanery of a lifetime's savings, the taking away of children from their parents by fraudulent guardianship proceedings. Hundreds of thousands of men, many of them immigrants, have been unable to collect their wages honestly earned. . . .

"From the cradle to the grave the poor man is the prey of a host of petty swindlers, who find it easy, through such devices as fraudulent assignments, trustee process, or garnishment of wages for fictitious debts, to rob and despoil. There exist

today businesses established, conducted, and flourishing on the principle that as against the poor the law can be violated with impunity because redress is beyond their reach. It is this situation which allowed such unrestrained abuse of the laws regulating the assignment of future wages that a sort of quasi-slavery resulted, which brought the loan shark into being, and permitted flagrant usury to grow into a monstrous thing.

"The effects of this denial of justice are far reaching. Nothing rankles more in the human heart than the feeling of injustice. It produces a sense of helplessness, then bitterness. It is brooded over. It leads directly to contempt for law, disloyalty to the government, and plants the seeds of anarchy. The conviction grows that law is not justice, and challenges the belief that justice is best secured when administered according to law. The poor come to think of American justice as containing only laws that punish and never laws that help. They are against the law because they consider the law against them. A persuasion spreads that there is one law for the rich and another for the poor." [1]

Income and Mental Health.—Health, as will be emphasized later, is of the mind as well as of the body, and income is a conditioning factor in the case of both.

Income influences mental health in many ways. Of primary importance in this connection is economic security, or, to be more accurate, the lack of it. "What it means to live without any surplus above immediate needs is difficult to imagine for the comfortable citizen. He rarely has occasion to worry seriously over what would happen in case of temporary interruption of income; there is a bank account, or a little property to be sold in case of a long illness, or at least some one to borrow from. Old age is far off, and his savings mount up promisingly. But a family that must count each penny to provide the next slender meal is plunged into sharp and genuine distress by any momentary reverse. Not only does poverty leave one unprotected when such troubles come; it

[1] SMITH, R. H., *Justice and The Poor,* The Carnegie Foundation, New York, 1919, pp. 8-10. Consult also CLAGHORN, K. H., *The Immigrant's Day in Court,* Harper & Brothers, New York, 1923.

makes these troubles far more frequent and severe than is the normal lot of mankind." [1]

The pace that kills is not the pursuance of that primrose path that popular speech implies; rather is it to live constantly in fear of the morrow, to move always under the shadow of uncertainty, to be benumbed ever by the insidious poison of worry. The worry generated by inadequate income breaks many more than the dissipation which its abundance permits. To be able, on the 20th of November to allocate all one's earnings until the 1st of May does not make for mental health, all learned dissertations on "Why I Believe In Poverty" to the contrary, notwithstanding.

There are other ways in which inadequate income affects mental health. Recent clinical practice is emphasizing the importance of focal infections in the production of mental and nervous disorders. It is just physical defects of this kind, often persisting for years the while they insidiously poison the system, that are most apt to be undiscovered or disregarded by persons in straitened circumstances. Adequate medical care, in so far as it is obtainable, is very costly, and a hunt for hidden factors is almost the first item to be neglected under economic pressure. Here is but another evidence of the fact that the poverty of the poor is their own destruction.

INCOME AND THE ART OF LIVING

There are other aspects and other values of life than those to which we have referred. Mere existence is one thing; living a full, free life, quite another. There are those manifold activities and interests which are the essence of the art of living, and in these, too, income is often more of a conditioning factor than we appreciate or are willing to confess. For income determines largely the presence or absence of concerts which inspire and express, of clothes which give complacency and confidence, of travel with its stimulating contact of mind with mind, of associations with their opportunities to discover congenial and kindred spirits, and of social contacts among

[1] Tugwell, R. G., Munroe, T., and Stryker, R. E., *American Economic Life,* Harcourt, Brace & Company, New York, 1925, p. 44.

people of differing backgrounds with their suggestive comparisons.

Income, as will be pointed out in the next chapter, is a fundamental factor in determining the standard of living. Its conditioning influence permeates every aspect of our lives. Everywhere its adequacy encourages continued effort, opens new possibilities, stimulates better performance, and softens the seriousness of our failures; everywhere its inadequacy wreaks its blighting course. In countless lives, for many centuries, there has been depression or inspiration, oppression or freedom, repression or expression—as income has dictated. The former of these alternatives constitute mere existence; the latter, the art of living.

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CHAPTER III

STANDARDS OF LIVING

WHETHER the water in a river is high or low depends on a comparison with its customary height. How any particular individual is to be rated in the scale of social well-being depends on the position of the other persons rated. Recent *Gestalt* psychology [1] has emphasized for us anew that the significance of an object, event, or fact is relative to its setting or background. It seems entirely pertinent, then, that an analysis of the economic basis of well-being should begin with a discussion of the scale of measurement. This chapter will be devoted, accordingly, to a discussion of the following main topics: first, the standard of living as the unit of measurement; second, the meaning of a standard of living; third, the factors which determine a standard of living; fourth, the cost of standards of living in the United States, past and present; fifth, rural standard of living studies; and sixth, the various levels of living as they exist in society.

STANDARDS AS A UNIT OF MEASUREMENT

"All social problems are essentially local and concrete. They must be measured by the conditions of the social group where they are found, and the success or failure of any individual is judged by the standards of success or failure within the group. . . . What is wealth in the heart of Africa is poverty in the heart of London. In a malarial region fever is inconspicuous. Such general terms as crime and poverty must be interpreted by the time and place in which the particular problem is located. As social problems are concrete and local, so social remedies must be adapted to particular conditions. One of the vices of reformers is to suppose that a scheme which

[1] KOFFKA, B., "The Growth of the Mind," Harcourt, Brace & Company, New York, 1924.

has worked well in one place is bound to work well in other places. Every social problem must be studied locally at first hand, and must be solved by measures which are adapted to the particular situation. . . . In working for individuals it can only be expected that they can be raised to the average condition of the group to which they belong." [1]

In the early stages of society, when only the more conspicuous cases of social inadequacy are dealt with, it is not so important to identify these standards as it is when, like in recent years, social interest is manifested in less obvious cases and becomes continually more discriminating. Standards are the working bases of the group, and as a group's efforts in any direction become more refined, there must be a corresponding development in the defining of the standards involved.

Social standards are of all kinds—moral, legal, esthetic, professional, cultural, material, etc. It is hardly necessary to add that we are concerned here chiefly with that general concept known as the standard of living, implying the daily routine of life as evidenced by the consumption of goods in the satisfaction of wants. Every group develops its own standards of living. It may be a smaller group, like a neighborhood or community, with which the individual is compared usually to determine the extent of his discrepancy and maladjustment. Then there are the standards of the more inclusive group, comprehending the range of an entire class or society, with which the smaller groups may be compared. An entire group may be so pathological that the individual is not conspicuous for any defect so long as he remains within his own group. With the modern emphasis upon group and community work, it is important that this aspect of the matter be appreciated.

THE STANDARD FOR GENERAL DISCUSSION

In a general study of this kind, the question arises as to which of these standards shall be selected for the basis of discussion. It might conceivably be possible to work out a standard of living for the entire United States. One often

[1] SMITH, SAMUEL G., *Social Pathology*, The Macmillan Company, New York, 1911, pp. 27-28.

hears of an American standard of living, contrasted with those of European countries. So widely extended, however, is our territory, so varied are the physical conditions under which the people of the United States live, so diverse are the racial elements of which our population is composed, and so little have we as yet been fused into a social whole, that a standard purporting to comprehend the entire country would be of very little value. The larger the number of units and the greater the diversities included, the less typical must a statistical average be. An arithmetic abstraction may be correct mathematically, but very misleading socially.

The division in modern societies, particularly as affecting standards of living, is on the basis of economic classes. Of these, the one whose standard is of the greatest importance is the industrial wage-earning class, and it is the standard of living of this group which is best suited for purposes of general discussion. While it is apparent at once that this class is as widely extended and as diverse racially as the entire population, yet there prevails about it a relative uniformity of conditions which, taken with the fact that it represents the minimum for the entire society, make it relatively satisfactory for our purposes.

THE MEANING OF A STANDARD OF LIVING

It next becomes necessary to distinguish between two conceptions of the term standard of living which are current, following the twofold significance of the word standard, as used in everyday language. "A standard may be either a type or average, or an ideal. Thus we speak of a standard typewriter, a standard-gauge railroad, a standard dictionary, a standard death rate. Used in this way, the word standard means the common, ordinary, accepted, or representative form of an object. In many cases it is practically equivalent to an average. In its other use, connotating an ideal, we speak of a man as having high standards, or another man as having no standards at all. We say of a third man that he has standards that he cannot live up to. So the phrase 'standard of living'

is used to mean either an ideal of the way in which people ought to live, or a type or average of the way they do live." [1]

The phrases *standards of living* and *scale of living* have been suggested to convey the two concepts involved. "The distinction between standard of living and scale of living must be carefully recognized. One's standard of living is in his mind. It is his conception of the way he wishes to live. It is the embodiment of his desires. One's scale of living is the way he lives, not the way he wants to live. If one who is living in a tenement wants to own a home; if he patronizes movies when he wants to go to operas; if he walks when he craves an automobile; if he toils six days a week when he wants to spend the winter traveling in Europe—he has a standard of living far above his scale of living." [2]

Now one, then the other, and at times a confusion, of these two conceptions have found their way into the definitions given to a standard of living. Parmelee, for instance, takes it to be the amount of economic goods necessary for a decent and wholesome life and for maintaining the highest physical and mental efficiency.[3] Similarly, to Gillin a standard of living is "the minimum below which the consumption of the family must not fall, if that family is to function properly as an independent and useful group in the community. It is the measure of consumption which supplies enough to enable each individual in that family to sustain himself in health and efficiency as a producer, and so be independent of the help of others." [4] Definitions such as these indicate a conception of a standard of living in terms of what it ought to be, for the well-being of society.

By far the greater number of students, however, have emphasized the concept of actuality rather than that of ideality. Streightoff refers to the standard of living "as the expression

[1] Fairchild, Henry P., *Outline of Applied Sociology*, The Macmillan Company, New York, 1916, pp. 82-83.

[2] Lescohier, D. D., *The Labor Market*, The Macmillan Company, New York, 1919, p. 95.

[3] Parmelee, Maurice, *Poverty and Social Progress*, The Macmillan Company, New York, 1916, p. 86.

[4] Gillin, John L., *Poverty and Dependency*, The Century Company, New York, 1922, p. 80.

is usually understood, [to] consist simply of what men actually do enjoy." [1] Fairchild defines it as "the average amount of necessaries, comforts, and luxuries enjoyed by the typical family in that group." [2] Comish says that "the standard of living represents the number and character of wants customarily satisfied." [3] Dorothy Douglas recently summarized the matter in these words: "Broadly speaking, a standard of living of any group of people is such a sum of accustomed goods and services as they consider absolutely essential to their maintenance." [4]

Again, both conceptions can be seen in the methods pursued in the various investigations of standards of living. In one group of studies the chief effort has been to determine the needs of the families considered and what these goods cost. When this is done by competent persons, the result may be very valuable as a working basis in efforts to raise the prevailing standard. But the fact remains that such a standard is a goal, not the representative achievement of these families. In the other type of studies a large number of budgets of families in a certain group are collected and the average expenditure computed. Or, the budgets may be classified and the minimum set as the point where the average family ceases to run into debt. In either event, the result obtained indicates the standard of the typical family in that group as it actually exists. Here the investigator and student are concerned with objective facts. All personal comment and conclusions are avoided. An effort is made to take a photograph, so to speak, of conditions as they are found.

FACTORS DETERMINING A STANDARD OF LIVING

The standard of living of a group is a product of many factors. Three of these, selected as being of primary importance, will be considered at this point.

[1] Streightoff, Frank H., *The Standard of Living,* Houghton Mifflin Company, Boston, 1911, p. 2.

[2] Fairchild, *op. cit.,* p. 83.

[3] Comish, Newel H., *The Standard of Living,* The Macmillan Company, New York, 1923, p. 62.

[4] Douglas, Paul H., Hitchcock, Curtice N., and Atkins, Willard E., *The Worker in Modern Economic Society,* The University of Chicago Press, Chicago, 1923, p. 272.

(1) Custom

The first factor is custom. "Although laws prescribing what a man may buy or sell have fallen into disuse, it must not be supposed that every man exercises his intelligence and pleasure to buy what will give him the most happiness. People are bound by custom where they have ceased to submit to law. A large part of the expense of most people is regulated, not by their own desires and demands, but by the demands of the public sentiment of the community about them. The standard of life of every family is fixed in large measure by social conventions. Few are intelligent enough to break away from those conventions, even where they are manifestly foolish. Although we have made much progress in the direction of economic freedom, it is a mistake to assume that the authority of custom in these matters is a thing of the past. With most men custom regulates their economic action more potently than any calculation of utility which they are able to make. Nor can we assume, as some writers are prone to do, that such custom represents the average judgment of the community as to the things needed for the comfort and happiness of its members. . . . It represents an average absence of judgment —a survival of habits which doubtless proved useful in times past, but which in many instances have entirely outlived their usefulness. The success of advertising shows how little intelligence is habitually exercised in these matters. A man does not generally exercise his nominal freedom to buy what he wants until some one comes and tells him in stentorian tones what he wants to buy. The authority of custom and tradition can only be overcome by the authority of drums and trumpets. It is a mistake to draw too-fine-spun deductions as to the motives which guide buyers in their choice, when three-quarters of the buyers exercise no choice at all. It is not merely that people want things which hurt them, or which fail to do them the maximum good . . . but that they buy things, without knowing whether they want them or not, through sheer *vis inertia*." [1]

[1] Hadley, A. T., *Economics*, G. P. Putnam's Sons, New York, 1896, pp. 69-70.

Groups differ, of course, and periods of history, too, in the extent with which its standards are influenced by custom. In each generation, however, that which has been plays a very important rôle in the determination of that which is. Our standard of food consumption certainly is much more a matter of custom than a selected combination based on a rational consideration of nutrition values. Meat is retained at the head of the list, even though the plenitude of game has passed and the majority of persons live a sedentary life. Americans despise Chinese coolies for eating unclean rats, but fail to understand why the Mohammedans and Jews despise us for eating the pig, equally unclean. Corn in Europe is stock food. To a genuine Southern mammy, such disposal must be little short of sacrilegious. At the outbreak of the World War, well-meaning Americans, in their provincial innocence, sent a lot of corn to feed the Europeans, which was promptly fed to the cattle. Sugar, because cheap, has been consumed in this country more than in any other except Great Britain. In 1914, we consumed 87 pounds of sugar per person per year, France but 37 pounds, while the average Russian family had perhaps a lump tied to a string and suspended from the ceiling, at which the children took an occasional nibble. Italians insist on having macaroni and olive oil and after coming to the United States continue to consume them, despite their relative expensiveness. "We feel that our care of the body suffices; but the Japanese, who take a hot bath every evening —even the humble coolie at least twice a week—complain that crowds of Americans are offensive in odor, while the Chinese have developed a care of the ears which is totally unknown to us. . . . The American jokes about the absence of toilet soap in his chamber in a French hotel, while the hotel-keeper shrugs his shoulders at the American's willingness to use a cake of soap after previous guests instead of carrying his own soap." [1]

Dress is largely a matter of custom, governed in part by tradition, in part by fashion. Once homespun was all the rage. Then with the coming of factory-made cloth, men and women

[1] Ross, E. A., *Principles of Sociology*, p. 223.

were content and proud with these. But cotton waists and cloth overcoats pass with the advent of furs and satins and silks. Successive epidemics of material and cut rage, regardless of how they protect the body and conserve its heat.

(2) Judgment

The customs of a group, however, are in process of constant modification by each succeeding generation, even in the most static society—the result of a vague sort of reasoning looking toward adaptation. The judgment of the group as to what is desirable and necessary is a second factor in the determination of its standards. Every individual has his more or less rational concept of what is essential to his maintenance and well-being. Whether a man considers himself well-dressed or well-fed cannot but be influenced by the requirements of his life. One demands "smart" raiment and high-tension amusement, the other wants serviceable clothes and healthy sport. The clerk must enter his office clean shaven, the mechanic wants a good scrub after work. Hospitality becomes a sacred duty in sparsely settled regions, because desirable for host and guest alike. The standards of a group may be compared to a composite photograph—the more dynamic the society the more constantly being retaken—certain features are being emphasized, others are blurred or fade out—both in the interests of a vague adaptive process. The emphasis on efficiency standards of living represents a conscious effort to establish rational norms of living—*i.e.,* to make the standard what it is thought it ought to be.

These aspirational standards of the group, ranging from a desire for simple comforts to "castles in Spain," are not woven out of the cloth of pure fancy. What an individual (or a group) thinks the standard of living ought to be depends on his experience, his range of choice, and how he has come to evaluate them. The progress of civilization, the creation of new wants and new utilities, the extent of knowledge, the ideals of the group, the kinds of leadership and their relative prestige, all combine to create the concept considered desirable.

(3) Income

What one would like to do is always subject to the check of possibility. It is so in regard to standards of living. Income limits the quality and quantity of obtainable satisfactions. In other words, purchasing power is a powerful determinant of existing standards. "In accounting for the modern standard of decency Sumner observes that 'the cheapening and popularization of luxury have made houses larger, plumbing cheaper, and all the apparatus of careful living more accessible to all classes. The consequence is that all the operations and necessities of life can be carried on with greater privacy and more ostentation of conventional order and decorum.' 'Therefore the standards and codes of all classes have risen and the care about dressing, bathing, and private functions . . . has been intensified.' " [1]

It appears, and the fact is highly significant, that the group fixes its standards of living at the highest point that can be maintained. Other things being equal, our standards are as high as our incomes permit. A relatively small proportion of persons or families make any accumulation of property, clearly indicating that the vast majority live up to the limits of their incomes. It is to be noted, too, that the group, after developing its standard to the limits of income, immediately makes that standard the irreducible minimum. In other words, the representative and minimum standards tend to be the same, and coincide with the highest average income of the typical family in that group.

What it has been, what it is thought it ought to be, and what it possibly can be—these are the fundamental factors which create the standard of living in any particular group.

FAMILY BUDGETARY STUDIES

Discussion of a standard of life becomes a matter of vital interest only when that standard is resolved into terms of concrete social units. The unit of living in society of necessity is the family. Society is organized on the assumption that

[1] Ross, *op cit.*, p. 569.

men and women will marry and raise families. The continuance of society hinges upon the fulfillment of this supposition.

The standard size of the family used by statisticians is that of five persons—father, mother, and three dependent children. The reasons for selecting three children have been, first, the assumption that five persons per family represents the actual size of American households according to the census returns; and second, the idea that three children per family is necessary for the perpetuation of the race. The ages of these three children, as assumed in the different budgetary studies, vary considerably, but agree in placing them under fourteen years of age. Objections to these assumptions have been urged by a number of students. These will be considered later. For the present we shall deal only with the fact, namely, that the standard family is reckoned uniformly at five persons, three of whom are young children.

There are two distinct phases to the study of family budgets. One is the determination of the detailed items which make up the standard. In other words, what does the standard consist of, in terms of such prosaic things as pounds of meat, quarts of milk, pairs of socks, sets of underwear, sheets of bedding, and the like? This is the more important and difficult part of the work. It is while engaged in this phase of their investigation that so many studies have not contented themselves with an enumeration of goods actually consumed, but have launched into ethical and health and decency considerations. The second part of the study of budgets involves ascertaining the cost of the various items included. This is a mere mechanical matter, demanding nothing more than careful field work.

THE COST OF STANDARDS OF LIVING

It is in the cost of the standard that the chief interest lies. Remembering, then, that our studies are in terms of families of five persons, living as wage-earners in industrial centers, what are the figures when the standard is translated into dollars and cents?

Including Europe, the history of the scientific study of fam-

ily budgets embraces less than forty years. The earliest attempt to set up and apply a minimum standard on a large scale was made in England by Charles Booth about 1890. For a number of years, dating from 1886, he studied in enormous detail the life of the people in the East End of London. In 1899, B. Seebolm Rowntree made an even more intensive study of York, England. In the United States, the movement did not begin until the opening years of the twentieth century, so that at the present writing (1927) the study of family budgets in this country covers a period of about two decades. During this time a considerable number of such studies have been made, showing a gradual improvement in objectivity of viewpoint, in accuracy of method, and in validity of conclusions. For the sake of convenience, and because they somewhat naturally arrange themselves so, brief summaries of the more important ones will be grouped in four main divisions.

Group I.—These cover the period up to 1906 and constitute a sort of introductory chapter to the more scientific studies made since that time. Most of them are not budgetary studies at all, but what have been called "wise guesses"—*i.e.*, estimates made by persons somewhat more than ordinarily familiar with the facts.

In 1902 the New York Bureau of Labor Statistics estimated that an income of $520 a year was inadequate for a family living in that city.[1]

In 1904 Robert Hunter expressed the opinion that $624 was not too much for a family of five persons in New York City. But in order to be thoroughly conservative he estimated that $460 a year was essential to defray the expenses of an average family in the North.[2]

Edward T. Devine writes in 1904 as follows: "Recognizing the tentative character of such an estimate, it may be worth while to record the opinion that in New York City, where rentals and provisions are perhaps more expensive than in any other large city, for an average family of five persons the

[1] Cited by Parmelee, *op. cit.*, p. 88.

[2] Hunter, Robert, *Poverty*, The Macmillan Company, New York, 1904, p. 52.

minimum income on which it is practicable to remain self-supporting and maintain any approach to a decent standard of living is $600 a year." [1]

About the same time, John Mitchell, an official of the American Federation of Labor, said that the minimum wage necessary to maintain a workingman and his family according to the American standard was $600 a year.[2]

One important study during this period differs in its method from these just cited, and that was an elaborate investigation into the incomes and expenditures of over 25,000 wage-earning families, made by the U. S. Department of Labor during the years 1902-03. Although no attempt was made in this study to set up derived standards of any sort, of the 25,000 families investigated, the Bureau selected some 11,000 as normal families. The average income of these families was about $650, of which on the average 5 per cent remained as surplus.[3] The average expenditure coincides then virtually with the figures named above, so that $600 a year may be taken as the cost of a fairly representative standard during these opening years of the twentieth century.

Group II.—Budgetary studies made during the years 1907 to 1914 are included in this group.

The first of these is that made in 1907 in New York City under the supervision of Robert C. Chapin, at the instigation of the New York State Conference of Charities and Correction. This was an exhaustive investigation and very carefully done. Among the conclusions presented, it was pointed out that "$825 is sufficient for the average family of five individuals, comprising the father, mother, and three children under fourteen years of age, to maintain a fairly proper standard of living in the Borough of Manhattan." [4]

[1] DEVINE, EDWARD T., *Principles of Relief,* The Macmillan Company, New York, 1904, p. 35.

[2] Cited from *Materials for the Study of Elementary Economics,* LEON C. MARSHALL, CHESTER W. WRIGHT, JAMES A. FIELD, The University of Chicago Press, 1913, p. 38.

[3] *Eighteenth Annual Report of the Commissioner of Labor for the Year 1903,* Government Printing Office, Washington.

[4] CHAPIN, R. C., *The Standard of Living Among Workingmen's Families in New York City,* Charities Publication Committee, New York, 1909, p. 281.

In 1908 the United States Bureau of Labor found that a fair standard of living in Fall River, Mass., for Portuguese, Polish, and Italian families cost $691, and for English, Irish, and French Canadian families about $732.[1]

In 1909-10 a smaller neighborhood investigation was carried on in Chicago under the direction of Mr. J. C. Kennedy for the University of Chicago Settlement. It was concluded by the persons making that study that no family of five could meet the minimum requirements of decent and efficient living in the stockyard district on less than $800 a year.[2]

After a careful review of the most important investigations made by 1913, Nearing came to the conclusion that "the available data indicate that a man, wife, and three children under fourteen cannot maintain a fair standard of living in the industrial towns of Eastern United States on an amount less than $700 a year in the Southern, and $750 a year in the Northern states. In the large cities, where rents are higher, this amount must be increased by at least $100." [3]

In 1914 a study of the cost of a standard of living in New York State was made under the auspices of the New York Factory Investigating Commission. Their report placed the figure at $876 for New York and at $772 for Buffalo as the amount necessary to furnish decent living to the typical family.[4]

Officials of the United States Public Health Service, after surveying all the budgetary studies made prior to the outbreak of the World War, conclude that "the point of adequate subsistence is not reached until the family income is about $800 a year." [5] This figure may be taken, then, as representing the results obtained by the studies in the second group.

[1] *Report on Condition of Women and Child Wage-Earners in the United States,* 61st Congress, 2nd session, Senate Document No. 645, Vol. XVI, pp. 238, 245.

[2] Kennedy, J. C., and others, *Wages and Family Budgets in the Chicago Stockyards District,* The University of Chicago Press, Chicago, 1914.

[3] Nearing, S., *Financing the Wage-Earner's Family,* B. W. Huebsch, New York, 1913, p. 97.

[4] Streightoff, Frank H., *Report on the Cost of Living,* Appendix VII, *Fourth Report of Factory Investigating Commission,* 1915, Albany, N. Y., 1915, pp. 1625-1656.

[5] Warren, B. S., and Sydenstricker, Edgar, "Health Insurance," *Public Health Bulletin* No. 76, Government Printing Office, Washington, p. 19.

Group III.—This group comprises the budgetary studies made during the war-time period, covering the years from 1914 to about 1920. During these years there was a rapid inflation of prices. From July 1, 1914, to April 1, 1918, the wholesale prices of forty-six essential commodities given in Bradstreet's Trade Journal showed a rise of 115 per cent. The National Industrial Conference Board declares that the cost of living for American wage-earners increased 104.5 per cent between July, 1914, and July, 1920. The United States Bureau of Labor Statistics states that its investigations in a number of industrial centers showed that prices of the essential items making up the family budget increased 112.7 per cent on an average from December, 1914, to June, 1920.[1] In short, within six years the cost of living in the United States more than doubled.

A study among wage-earners in the District of Columbia in 1916 by the Bureau of Labor Statistics showed that up to an annual income of $1,200 a year most of the families showed a deficit. On the other hand, most of those with an income above $1,200 saved money. This figure may be taken, then, as a representative one of the cost of the accepted standard.

The Social Service Bureau of Bellevue Hospital in New York City found in 1917 that $1,018 was necessary for the maintenance of a decent standard in New York.[2]

In 1917 there was appointed a board of arbitration to determine the matters in controversy between the Puget Sound Traction, Light and Power Company, the Tacoma Railway and Power Company and their employees. The award, as finally made by the board in the fall of 1917, was based directly on budgetary studies regarding the cost of living. The budget worked out and approved by the board concluded that $1,506 was necessary for a standard of minimum comfort for a family of five persons.[3]

Dr. Peixotto, of the faculty of the University of California,

[1] Epstein, Abraham, *Facing Old Age*, A. A. Knopf, New York, 1922, pp. 103-107.

[2] *Standards of Living, A Compilation of Budgetary Studies, Revised Edition*, Bureau of Applied Economics, Washington, 1920, pp. 111-115.

[3] *Ibid.*, pp. 96-102.

in October, 1917, prepared a detailed estimate of the minimum outlay required for a workingman's family of husband, wife, and three children of school age, in San Francisco. This amount she placed at $1,476 with the statement that it covered a minimum standard of wholesome living and not mere existence.[1]

In June, 1918, Professor William F. Ogburn, then in charge of the cost-of-living section of the National War Labor Board, prepared and submitted for the use of the board two budgetary studies as to the cost of maintaining a family of husband, wife, and three dependent children. The first he designated as a "minimum of subsistence" level. The total cost of this, at prices then prevailing, he fixed at $1,386. The second he designated as a "minimum comfort" budget, the total cost of which, at prices then prevailing, was fixed at $1,760.[2]

The Philadelphia Bureau of Municipal Research made a study of workingmen's standards of living in Philadelphia in 1918-19, which is one of the most thorough and painstaking that has yet been made. The basic standard framed, on the basis of elaborate schedules from 260 wage-earning families in Philadelphia, was halfway between the subsistence and comfort standards formulated by Mr. Ogburn. At the prices prevailing in August, 1918, the cost of this standard was $1,637; in November, 1919, it was $1,803; and by the winter of 1921 it had risen to $1,847.[3]

Several interesting studies were made during this period by the National Industrial Conference Board. One, among the wage-earners in Fall River, Mass., fixed $1,268 as the amount necessary in October, 1919, for the maintenance of a minimum standard, and $1,574 for a more liberal standard. A similar distinction between these two kinds of standards was made in their investigation in Lawrence, Mass., made at the same time, October, 1919. Here the figures were $1,386 and $1,658, respectively.[4]

[1] *Standards of Living,* pp. 115-118.
[2] *Ibid.,* pp. 92-96.
[3] *Ibid.,* pp. 64-73.
[4] *Ibid.,* pp. 73-89.

An annual income of $2,262 was found necessary to maintain a family of five at a level of health and decency in Washington, D. C., according to a budget prepared by the U. S. Department of Labor Statistics in August, 1919.[1]

It is apparent that the year 1914 marked a turning point in the cost of a standard of living. From that of $800, rather generally accepted before the war, the figures increased from $1,200 in 1916 to about $1,800 in 1918 and finally to $2,262 by the close of 1920.

Group IV.—In this last group are placed what might be called the post-war budgetary studies, made since the beginning of 1920.

At the request of the United Mine Workers of America, Professor Ogburn drew up and submitted to the Bituminous Coal Commission, in January, 1920, a quantity-and-cost budget specifically for bituminous mine workers. For maintaining a miner's family at a level of health and decency, $2,144 was stated as being necessary on the basis of prices then existing.[2]

Four studies were made during 1920 by the National Industrial Conference Board. The month of the year, the place of the study, and the amounts designated are as follows: January, West Hoboken, N. J., $1,610; February, three Carolina cotton towns, $1,410; May, Cincinnati, Ohio, $1,692; June, Worcester, Mass., $1,733. The first two are the figures for a minimum standard, the latter two for a more liberal one.[3]

In October, 1920, the Council of Social Agencies in Chicago fixed upon $1,733 as the amount necessary to maintain a family of five persons living in that city at a level of health and decency.[4]

The standard formulated by the Philadelphia Bureau of Municipal Research in 1918, repriced in August, 1921, was found to cost $1,847.

Two further studies made by the National Industrial Con-

[1] *Standards of Living, op. cit.*, pp. 26-48.
[2] *Ibid.*, pp. 48-64.
[3] Douglas, Hitchcock, and Atkins, *op. cit.*, p. 286.
[4] *Ibid.*, p. 286.

ference Board need to be included here. One was made in Detroit in September of 1921, and $1,698 found necessary for what in the studies of this board has been called the more liberal standard. The other study was in the anthracite-coal region of Pennsylvania, where, in February, 1922, the amount designated was $1,322, this for the minimum rather than for the more liberal standard.[1]

RURAL STANDARD OF LIVING STUDIES

Rural standard of living studies, to which no reference has been made thus far, constitute a separate group in the literature of the subject under discussion. These studies are a product of the last two decades and are indicative of two rather well-defined tendencies in the field of rural well-being. The first of these is an apparent determination to give to rural problems the same objective and scientific consideration that is given to similar problems in other fields; the second is a growing recognition by persons interested in rural life that the problems of consumption are as important as those of production, that the utilization of agricultural income is as important as the problem of earning such income.

It is quite pertinent that urban and rural groups be recognized as two distinct fields for the study of standards of living. "Urban findings cannot be applied to farm conditions, and *vice versa*. The plan or scheme of farm life differs from that of the city. The major satisfactions of farm life come from very different sources and may be much less dependent on money than those of urban life. Farmers often derive no small amount of satisfaction from an interest and a pride in pure-bred live stock which they keep or in high-yielding strains of choice grains or fruits which they are trying to develop. Farm women frequently get real pleasure from showing and from serving to friends home-grown and home-preserved fruit and vegetable products, and the care of the garden is often a pleasure. Farm boys and girls have an opportunity for apprenticeship unequaled in any other trade or occupation. The whole scheme of farm life and farm interests must be

[1] Douglas, *et. al., op. cit.*, p. 286.

kept in mind when inferences or conclusions are being drawn from comparisons of expenditures, on the whole or item by item for farm and city families." [1] Equally, and uniquely, different are the technical problems involved in the objective study of standards.[2]

Marked progress in the rural-living studies has been made in the last few years. The Purnell Act has increased greatly the number of such researches. In addition to the earlier investigators in the field, the Home Economics group has taken up the problem, and still more recently, the agricultural economists have been drawn into it. The result of this synthesis has been the stimulation of discussion, the introduction of fresh viewpoints, and the prevention of premature standardization of researches. In the rural as in the urban field, a too great eagerness to formulate principles of social science means correspondingly less haste in so doing.[3]

The present stage reached apparently is one "in which those who have been doing the preliminary work and trying out various methods normally get together and concentrate on methodology for a while before going back into the field for more data.[4] Certainly, and fortunately, the period of broad generalizations is over. Attention is now being centered upon the sub-divisions of the family budget, upon such specific items as "housing, home planning, kitchen conveniences, heating devices, home canning, selection of foods and clothing, care of the teeth, choice of an automobile, farm gardens, farm lawns, rural schools, and community recreation. This detailed type of work must be done mostly by home-management specialists, farm-engineering specialists, horticultural specialists, and social-service specialists, and very little by mere sociologists and economists." [5]

[1] KIRKPATRICK, E. L., "The Farmer's Standard of Living," U. S. Department of Agriculture, Bulletin No. 1466, Washington, 1926, p. 4.

[2] Cf. articles by HOYT, E. E., and ZIMMERMAN, C. C., in the *Journal of Farm Economics*, April, 1927, for discussion of some of these problems in the making of rural-living studies.

[3] ZIMMERMAN, *op. cit.*

[4] *Ibid.*, p. 236.

[5] *Ibid.*, pp. 233-234.

DIFFERENTIATION IN STANDARDS OF LIVING

Any social catastrophe shakes society out of its ruts and necessitates a widespread reconstruction of standards of all sorts. Such a catastrophe was the World War, and among other things, with the rapid inflation of prices and the heavy competing demands on all sides for labor, there were bound to be fundamental changes and readjustments in regard to standards of living. Under such circumstances there will be emphasized not the customary but the aspirational standards of the group. An examination of the budgetary studies made since the outbreak of the war shows that they took more account of the decencies and amenities of life than the accepted earlier standards. "The term 'minimum comfort budget' was first used at this time. William F. Ogburn, then examiner for the National War Labor Board, drew up most of these more-than-subsistence budgets. The United States Bureau of Labor Statistics in 1920 generalized Ogburn's 'comfort' data so as to furnish a strictly quantity budget applicable to different regions and industries. It calls this a 'health and decency minimum.'

"A comparison of two of Ogburn's budgets, for the lower and higher grade shipyard workers, shows wherein the chief difference between the 'minimum' and 'comfort' standard lies. At the comfort level the family spends a smaller proportion of its budget for food and a larger proportion for clothing and sundries. At the 1918 price level Ogburn's 'minimum' standard was supposed to cost a little under $1,400, and his 'comfort' standard about $1,760, yet the cash allowance for food for the two families was almost practically the same.

"It will be noted that in thus taking over the single standards of the earlier investigations and using them as the lower of the two differentiated standards—a 'subsistence' and a 'comfort'—Ogburn and his fellows were probably though unintentionally pushing these earlier standards down a little below where they were originally intended to go in the average person's estimation. Chapin *et al.* had not intended their minimums like, for example, Rowntree's, to represent bare

physical subsistence; decency and normal social contacts were always included in them as well as mere health."[1]

A careful examination of the various studies made enables one to distinguish four rather definite levels or standards of living.[2]

1. *The Poverty Level.*—This represents roughly a standard of living just above where the families receive aid from charity or where they run into serious debt. It is a level at which the income, even though expended with ordinary prudence, is not sufficient for even the physical upkeep of the family. It merely keeps body and soul together. It appears that families in the larger American cities now living on from $1,000 to $1,100 a year exist at this level.

2. *The Minimum-of-subsistence Level.*—This is based essentially on mere animal existence and allows little or nothing for the needs of man as a social creature. In other words, it makes possible the physical and material upkeep of the family, barring the emergencies of life, and ignoring the social pleasures that cost money. It is not said that the social pleasures are not obtained, but that they must be secured at the cost of other essentials. Families living on from $1,100 to $1,400 at the present time live at a subsistence level.

3. *The Subsistence-plus or Minimum of Health and Decency Level.*—This represents a somewhat higher level than that of subsistence. It provides not only for the material needs of food, shelter, and body covering, but also for certain comforts, such as clothing sufficient for bodily comfort and to maintain the wearer's self-respect; insurance against the major misfortunes of life; a degree of education for the children; and some expenditure for amusement and self-development. It is this standard that practically all the earlier American students of cost-of-living problems had in mind. At present prices, such a standard would probably cost from $1,500 to $1,800.

4. *The Comfort Level.*—When one attempts to go beyond the health and decency standard, serious difficulties arise.

[1] Douglas, Hitchcock, and Atkins, *op. cit.*, pp. 279-280.
[2] *Ibid.*, Chap. IX.

The term comfort is vague, and at once precipitates discussion as to what particular "comforts" shall be included. The line between comfort and luxury is not a clear-cut one, and unless great care is taken, the standard becomes so high as to be useless for the purpose in mind. A rather sane conception of a comfort standard has been given recently by a student of family budgets in the following words:

"This is the level that has come to public attention since the war. It represents the attainment of the highest class of wage-earners and the cynosure of the rest.

"At the comfort level, the expenditures for food will not rise very much, the larger increase being taken up almost entirely by clothing, housing, and especially 'sundries.' The proportion spent for sundries increases in about the same ratio as the proportion spent for food decreases. Indeed, a fairly good criterion of the point at which the 'subsistence-plus' level is passed and the 'comfort' level begins, would be the point where the expenditures for sundries passes the 25-per-cent mark. (This may be taken as analogous to the sudden increase in rent that usually marks the transition from a 'subsistence' to a 'subsistence-plus' level.)" [1]

At the present time, such a comfort budget for families of five would probably exceed $2,000.

SUMMARY

On the whole, in view of the shortness of the time devoted to it, progress in the study of standard of living problems has been satisfactory. The subject is not yet upon a plane of absolute scientific precision, but the results of recently published investigations offer material of great value. With the work of earlier students to build on, later studies are becoming constantly more accurate and more valuable for use in the scientific study of social well-being.

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CHAPTER IV

WAGES AND INCOMES IN THE UNITED STATES

Attempts to formulate a standard of living and to translate it into monetary terms lead inevitably to the question: What proportion of the population attain to that standard? If the standard be an aspirational or ideal one, to what extent is it within the range of possibility? Likewise, if the standard is a typical or representative one, interest centers in the variations from it. In connection with the study of social ill-being we are concerned particularly with the variations below the accepted standard. The question of wages and income, then, is complementary to that of standard of living costs. To the extent that the budgets studied are representative and the work done accurately on the one hand, and family income data are available on the other, it is possible to measure social and economic welfare within the range of scientific approximation. The various standard of living studies having been summarized in the preceding chapter, we shall proceed now to survey the data on wages and incomes among the people of the United States.

THE LACK OF ADEQUATE DATA

Candor compels the admission that the collection of wage and income data in the United States constitutes a sorry chapter in the history of social statistics. It is only within the last half century that the science of statistics has attained importance in the public mind, and in this development the United States has far from led the way. A comparison of the vital statistics of this country, for instance, with those of the leading nations of Europe, is anything but complimentary to national pride. A country which has birth-registration data for but a decade, and those for a small proportion of its population, cannot be expected to have anything like adequate

wage and income data. Our deficiency in respect to this last-named matter is, then, but a phase of a much more extensive situation covering the entire field of social statistics.

The shortcomings of our wage and income data are of two kinds. First, too few data have been gathered. Comparatively little effort to secure the facts has been made by the agencies which have the facilities for getting the necessary information. Specialized and local studies there are, but comprehensive and continuous data are lacking. In the second place, there has been a good deal of defective statistical workmanship, particularly in the compilation of wage data. Units of measurement have been defined inaccurately and loosely. Even when standardized in individual establishments or reports, as between these they may differ materially, making comparisons impossible or of little value. There has been no standardization in regard to the criteria by which wages and salaries are distinguished, and it is possible to find instances where wages and earnings are used synonymously without any seeming appreciation of their differences. Available sources of information have been biased—trade unions emphasizing minimum and nominal wages; those secured from employers are for a limited time, usually for a week, except in case of more intensive studies. Nor have these differences been recognized, as a rule. Then, too, because easy and convenient, the concept of the average is used constantly, despite the obvious fact that it is a purely mathematical concept, a shorthand way of expressing an arithmetical result, without corresponding necessarily to any group of workers. Perusal of any introductory manual on statistical methods will make clear almost immediately the offenses which have been committed in the compilation of American wage data.

THE NECESSITY FOR WAGE STATISTICS

The question of wages has become one of commanding importance in modern industrial civilization. Approximately two-thirds of the people gainfully employed in the United States are employed for wages. The bulk of the population

in this as well as in other industrial nations may be described then as a "wage-earning" group. King's study [1] of the distribution of wealth in the United States shows that about 80 per cent of the population have little or no accumulation of property, owning altogether less than 10 per cent of the total wealth of the nation. This means, in other words, that four-fifths of the population are dependent entirely or very largely upon service as over against property income. Barring a small class of persons employed for stated annual salaries, it is conservative to say that two-thirds of the gainfully employed population are dependent upon wages to provide the necessaries of life.

This development of the "wage system" has forced wages into the foreground of discussion. "Socialists are condemning the 'wage system'; social workers and those interested in ameliorating the condition of the poor are constantly urging the payment of a 'living' or of a 'minimum' wage. Wages are the bone of contention in industrial disputes, and by some are thought to be the ultimate source of all our industrial ills. Efficiency advocates are studying various methods of wage payment in an attempt to harmonize the principles of industrial efficiency with the interests of employees and thereby to enlist their support in having them adopted. Others are testing the level of wages in terms of their purchasing power either to measure their trend or to demonstrate their reasonableness. Still others are attempting to adjust to an increased nominal wage scale the prices charged for commodities and services in the hope of 'making both ends meet.'" [2] It must be very clear that if these problems of wage adequacy and wage theories are to be lifted from the maze of speculation into the clear air of scientific analysis, it must be done through the compilation of wage data considerably more comprehensive and accurate than are available at the present time.

[1] King, Willford I., *The Wealth and Income of the People of the United States*, The Macmillan Company, New York, 1915, Chap. IV.

[2] Secrist, Horace, *An Introduction to Statistical Methods*, The Macmillan Company, New York, 1917, pp. 78-79.

TWENTY YEARS OF WAGE DATA

With the above acknowledgment of the inadequacy of our information on the subject of wages in the United States, the available data will now be reviewed. Since the standard of living studies were presented in chronological sequence, a similar order will be preserved with reference to the wage data.

Wages Prior to 1907.—One of the earliest, as well as one of the most extensive, investigations of wages in the United States was made by the Census Bureau in its special report on manufactures in 1905. This study covered 3,297,819 wage-earners, of whom 2,619,053, or 79.4 per cent, were men; 588,-599, or 17.9 per cent, were women; and 90,167, or 2.7 per cent, were children. An examination of the earnings of males, sixteen years of age and over, engaged in manufacture in 1904, shows that 25.5 per cent were earning less than $8 a week, or $416 a year; that 46.5 per cent were earning less than $10 a week, or $520 a year; that 70.3 per cent were earning less than $15 a week, or $780 a year; and that 98 per cent were earning less than $25 a week, or $1,300 a year. These, let it be remembered, are wage rates, although the term earnings is generally used.[1]

Summarizing all of the available data, Frank Streightoff concluded that in 1904, "it is reasonable to believe that something over 60 per cent of the males at least sixteen years of age, employed in manufacturing, mining, trade, transportation, and a few other occupations associated with industrial life, were earning less than $626 per annum, about 30 per cent were receiving $626 but under $1,044, and perhaps 10 per cent enjoyed labor incomes of at least $1,000. If to these the agriculturists are added, 65 per cent fall into the low-earnings group, 27 in the medium, and 8 in the high. Suppose all the men engaged in gainful occupations in 1904, but unaccounted for in this estimate, to have been paid $12 a week or more. This is manifestly impossible, yet, even upon such an assump-

[1] *Manufactures,* Census Bureau, Part IV, pp. 643-648.

tion, fully one-half of the adult males engaged in remunerative labor were rewarded that year with less than $626." [1]

Wages: 1907-14.—Gathering the wage statistics from various state bureaus of labor and from a number of specialized reports, all covering the years 1908-10, Nearing made the following summary: "The average wage statistics showed that the average wages of adult males were in the neighborhood of $600. On the other hand, a study of classified wage statistics shows that half of the adult males working in the industrial sections of the United States receive less than $600 a year; three-fourths are paid less than $750 annually; and less than one-tenth earn $1,000 a year. . . . These figures are not accurate, however, since they are all gross figures—including unemployment. They should be reduced by perhaps 20 per cent, varying with the year, the location, and the industry. There may be no general agreement as to what reduction should be made—but some reduction is obviously necessary. Making, therefore, a reduction of one-fifth, it appears that half of the adult males of the United States are earning less than $500 a year; that three-fourths of them are earning less than $600 annually; that nine-tenths are earning less than $800 a year; while less than 10 per cent receive more than that figure." [2]

Nearing's conclusions, startling as they may seem, are borne out by another study made during the same period. The Federal Immigration Commission gathered data on wages of 220,390 male employees in representative establishments in industrial localities covering the years 1908-09. This investigation showed that 32.6 per cent earned less than $10 a week, or $520 a year; that 59.2 per cent earned less than $12.50 a week, or $650 a year; that 74.5 per cent earned less than $15 a week, or $780 a year; and that 93 per cent earned less than $20 a week, or $1,040 a year. This study is one of wage rates,

[1] Streightoff, F. H., "The Distribution of Incomes in the U. S.," *Columbia University Studies in History, Economics and Public Law,* Vol. LII, No. 2, New York, 1912, p. 139.

[2] Nearing, Scott, *Wages in the United States,* The Macmillan Company, New York, 1911, pp. 211-213.

no account being taken of time lost for any cause whatsoever.[1]

In another study of the annual earnings of 26,616 male wage-earners eighteen years of age and over, made by this Commission, allowance was made for time lost during the year, so that this summary is one of actual earnings. It shows that the earnings of 49.7 per cent were less than $400 a year, of 74.7 per cent less than $600 a year, and of 97.3 per cent less than $1,000 a year.[2]

Of considerable significance, too, is this same agency's investigation of the annual earnings, allowance made for time lost during the year, of 15,083 male heads of families who were employed in mines and manufacturing establishments. The summary shows that the annual actual earnings of 31.4 per cent were under $400 a year, of 50.4 per cent less than $500 a year, and of 66.5 per cent under $600, of 78.5 per cent under $700, of 89.2 per cent under $800, and of 97.2 per cent under $1,000 a year.[3]

Continuing his investigation of wages for the years 1910-12, Nearing presents significant data on classified wage rates for male wage-earners in selected industries and occupations, as shown in the tables on pages 68 and 69.

Lauck and Sydenstricker, summarizing the statistics of weekly wage rates up to about the year 1915, write as follows: "Taking all the principal industries, for which data are available, into consideration, the conclusion appears to be warranted that during the past few years between one-fifth and one-third of the male workers eighteen years of age and over earned at rates of less than $10 a week, between two-thirds and three-fourths earned less than $15, and only about 10 per cent earned more than $20 a week. This does not take into consideration time lost from any cause, although some of the statistics upon which this conclusion is based specify actual weekly earnings, while other statistics afford data as

[1] *Abstracts of Reports of the Immigration Commission,* 61st Congress, 3d session, Senate Document No. 747, Vol. 1, p. 375.
[2] *Ibid.* p. 408.
[3] *Ibid.,* p. 405.

TABLE I

COMPENSATION WAGES FOR MALE WAGE-EARNERS IN CERTAIN MANUFACTURING INDUSTRIES[1]

	Total Employed	Per Cent of Males Receiving Wage Rates per Year of Less Than					
		$250	$500	$750	$1,000	$1,250	$1,500
Iron and steel industry (1910)	172,706	....	8	60	85	.....	97
Textiles—cotton (1910–11)							
North	11,041	5	54	94	.....	.....	.....
South	3,784	22	85	97	.....	.....	.....
Woolen and worsted (1910–11)							
Dyeing	791	....	87	92	.....	.....	.....
Finishing	1,644	2	76	85	.....	.....	.....
Lawrence (1911)	11,075	5	56	....	.....	.....	.....
Little Falls (1912)	2,502	7	63	87	96	.....	.....
Woolen (Bureau of Labor 1910–11)	17,178	1	30	77	97	.....	.....
Cotton (Bureau of Labor 1910–11)	28,478	8	57	97	.....	.....	.....
Pulp and paper industry (1910)	9,173	....	32	83	94	96	96
Lumber (1910–11)	59,228	....	39	91	96	.....	99
Mill work (1910–11)	32,405	....	14	57	74	.....	98
Furniture (1910–11)	34,095	....	10	47	93	.....	99
Cigar (1910–11)	3,615	....	6	29	53	.....	96
Meat packing (1910–11)	7,096	12	39	83	96	.....	.....

to weekly full-time earnings, or weekly rates of pay. The conclusion has been stated in terms of sufficient latitude to allow for these considerations." [2] With reference to the annual earnings of wage-workers, their conclusions are that "fully one-fourth of adult male workers in the principal industries and trades, who are heads of families, earned less than $400, one-half less than $600, four-fifths less than $800, and less than one-tenth as much as $1,000 a year." [3]

Other students agree substantially with these conclusions

[1] NEARING, SCOTT, "Wages and Salaries in Organized Industry," *Popular Science Monthly*, May, 1915, p. 497.

[2] LAUCK, W. JETT. and SYDENSTRICKER, EDGAR, *Conditions of Labor in American Industries*, Funk & Wagnalls Company, New York, 1917, pp. 29-30.

[3] *Ibid.*, p. 61.

TABLE II

COMPENSATION RATES FOR MALES IN CERTAIN GROUPS OF OCCUPATIONS[1]

	Per Cent of Males Receiving Wage Rates[1] per Year of Less Than					
	$250	$500	$750	$1,000	$1,250	$1,500
Bell Telephone System Leading Occupations (1908)	.....	5	40	80	.....	99
Mercantile establishments, California (1911–12)	.....	10	30	55	.....	.....
Iron and steel, United States (1910)	.....	10	60	85	.....	97
Textiles (1910–12)	.....	60	90	95	.....	.....
Miscellaneous (1910–11)	.....	30	60	90	.....	98
Manufacturing:						
Massachusetts (1910)	1	34	71	91	.....	.....
New Jersey (1911)	2	36	71	89	.....	.....
Kansas (1909)	2	26	70	91	.....	.....
Wisconsin (1909)	2	32	77	94	.....	99
Oklahoma (1911)	1	17	68	90	.....	.....
California (1911)	2	7	30	63	.....	.....
Census (1905)	8	47	79	94	.....	.....

for this time. Nearing, revising his summary in 1915, found that the great majority (almost nine-tenths) of the adult males receive wage rates of $1,000 per year or less, that four-fifths fall below $750, and a third below $500.[2] Officials of the United States Public Health Service, writing about the earners of the country got less than $600, and four-fifths less than $800, a year.[3]

Wages During the War Period: 1915-1920.—The World War led to a decided change in money wages just as it did in the cost of living. Wage data, however, for the years since 1914 are rather unsatisfactory. Most of them are expressed in terms of averages which, as has been noted, may or may not be of much value. Several things, even if somewhat indefinite, one may be sure of after examining average wage statistics: that some workers receive less than the amount

[1] NEARING, *op. cit.*, p. 502.

[2] NEARING, SCOTT, *Income*, The Macmillan Company, New York, 1916, p. 106.

[3] WARREN, B. S., and SYDENSTRICKER, EDGAR, *Health Insurance, op. cit.*, p. 35.

named, that others receive more, and that a great many receive in that neighborhood if the average be for an industry the great majority of whose employees do approximately the same kind of work and earn about the same wages.

The weekly wages received during the year 1915 throughout the United States in the various industries have been compiled by the Bureau of Applied Economics from the published surveys of the United States Bureau of Labor Statistics. These were found as follows in the different industries: [1]

TABLE III

Industry	Per Capita Earnings per Week—1915	Average Yearly Earnings 1915—a x 52
Boots and shoes	$12.12	$630.24
Cotton finishing	10.54	548.08
Cotton manufacturing	8.31	432.12
Hosiery and underwear	7.75	403.00
Iron and steel	11.76	611.52
Men's ready-made clothing	11.92	619.84
Silk manufacturing	8.99	467.48
Woolen manufacturing	9.70	504.40
Cigar manufacturing	9.33	485.16
Automobile manufacturing	17.23	895.96
Leather manufacturing	11.76	611.52
Paper making	13.20	686.40

The National Industrial Conference Board, an association of employers of labor, has published some reports analyzing the wage changes in selected industries. These studies are reported to be based on actual earnings rather than wage rates. Throughout, the wage data used for comparison represent weighted averages of earnings in the different industries, based on payroll figures for one week in each of the years covered in the investigations. For the years 1914 and 1918, the figures presented refer to the payrolls of the third week in September, while in 1920 the averages are for the first week

[1] "Wages in Various Industries," *Bureau of Applied Economics*, Washington, 1919, p. 60.

in March. It will be noted that the weeks selected contain no holidays and are favorable normally to full employment.

TABLE IV

AVERAGE EARNINGS OF MALE EMPLOYEES IN TWELVE INDUSTRIES AS REPORTED BY THE NATIONAL INDUSTRIAL CONFERENCE BOARD[1]

Industry	September, 1914		September, 1918		March, 1920	
	Average Actual Weekly Earnings	Average Yearly Earnings	Average Actual Weekly Earnings	Average Yearly Earnings	Average Actual Weekly Earnings	Average Yearly Earnings
Boots and shoes	$14.51	$755	$23.62	$1,228	$28.70	$1,492
Chemical manufacturing	13.07	680	25.24	1,312	35.72	1,857
Cotton manufacturing	9.91	515	20.50	1,066	24.87	1,293
Furniture manufacturing	10.78	561	17.39	904	22.87	1,189
Hosiery and knit goods	11.25	585	22.50	1,170	27.65	1,438
Leather	11.01	573	23.36	1,215	30.18	1,569
Metal manufacturing	13.99	727	27.73	1,442	29.79	1,549
Paper manufacturing	13.10	681	23.20	1,206	28.82	1,499
Printing and publishing	18.33	953	23.69	1,232	31.67	1,647
Rubber manufacturing	14.99	779	27.93	1,452	36.32	1,889
Silk manufacturing	11.10	577	21.48	1,117	28.98	1,507
Wool manufacturing	11.11	578	22.93	1,192	28.70	1,492

The reports from which the foregoing table is compiled present only weekly earnings. They are multiplied by fifty-two to enable the reader to translate at a glance that wage into a yearly concept. It is obvious, of course, that the average yearly wage nowhere will be fifty-two times the earnings of a week in which there are no holidays and which is favorable to full employment.

The statistics just cited can be supplemented by those collected by the United States Bureau of Labor Statistics in its industrial survey of 1919. This survey covered 28 industries scattered through 43 states, including 2,365 establishments,

[1] "Changes in Wages During and Since the War," *National Industrial Conference Board,* New York, 1920.

780 occupations, and a total of almost 405,000 employees.[1] "The average number of hours worked by the male employees was 45.6 per week and the average earnings per hour were 56.1 cents, making the average weekly earnings $25.61. With fifty-two weeks of such employment, the average yearly earnings would have been $1,332. This, however, is merely an average. Ten per cent of the male employees were employed for less than twenty-four hours a week, and reckoning cumulatively, 16 per cent were employed for less than thirty hours, 22 per cent less than thirty-six hours, and 31 per cent less than forty-two hours. Assuming that these short-time workers received the average hourly wage of the groups as a whole, a week's work of twenty-four hours would then net only $13.66 and, if this were typical of the year as a whole, the yearly earnings would be $710; a thirty-hour week would bring in $16.83 or at a yearly rate of $875; a thirty-six-hour week would amount to $20.20 or the yearly equivalent of $1,050, while a week of forty-two hours would spell weekly earnings of $23.56 and a yearly earning rate of $1,225. Part of the apparently short hours worked was undoubtedly caused by labor turnover and thus probably making the yearly personal earnings more than is otherwise indicated."[2]

Wages in the Post-war Period: 1920.—Another recent significant study of earnings is that made by the United States Coal Commission. The report on earnings of bituminous mine workers in 1921 covers 1,177 union and 751 non-union mines, employing on an average 332,668 mine workers during the year. Below are summarized the earnings of tonnage men—*i.e.,* those engaged in actually mining the coal and unloading it into the cars. Since there is considerable shifting from one mine to another, the summary includes only those workers who began and ended the year in the same mine and who drew pay at that mine during each of the twenty-four pay periods in the year. Among other things, the table shows that of the non-union miners 18.4 per cent received less than

[1] "Industrial Survey in Selected Industries in the United States, 1919," *U. S. Department of Labor, Bureau of Labor Statistics,* Bulletin No. 265, Government Printing Office, Washington, 1920.

[2] Douglas, Hitchcock and Atkins, *supra.,* p. 302.

$900 in 1921, 43.7 per cent less than $1,200, 66.6 per cent less than $1,500, 71.4 per cent less than $1,800, and 87.9 less than $2,000. Earnings ran somewhat higher in the union mines. Of the union miners, 11.3 per cent earned less than $900 a year, 31.6 per cent less than $1,200, 54.7 per cent less than $1,500, 74.3 per cent less than $1,800 and 83.7 per cent less than $2,000.[1] It should be added, however, that the year 1921 witnessed the end of the post-war activity in the bituminous coal industry, so that the average days worked dropped to an unusually low point.

A study of earnings in the anthracite region for 1921 was made by the Institute of Economics, under the direction of Dr. H. B. Drury. Below is given a summary of the earnings of all anthracite employees who remained at one mine from the beginning to the end of the calendar year.

TABLE V

ANTHRACITE FULL-YEAR EMPLOYEES, 1921[2]

Per Cent of Employees in each group earning less than each specified amount per year

Amount	Contract Miners	Miners' Laborers	Inside Day Men	Outside Day men
$ 900	.2	.7	.6	7.1
1,200	2.0	15.4	9.0	22.9
1,500	10.6	63.1	52.5	53.3
1,800	31.7	89.8	82.4	81.0
2,000	49.5	95.5	93.2	92.2
2,400	78.6	99.4	98.8	99.3

It is pointed out that the earnings of full-year employees give slightly too favorable an idea of the opportunity of earnings among anthracite workers as a whole. The shifting contract miners and miners' laborers earn a little less per start than do the full-year employees; and the shifting day men average

[1] "Report of Earnings of Bituminous Mine Workers in 1921," *United States Coal Commission.* Prepared under the direction of MISS ANNE BEZANSON of the University of Pennsylvania, assisted by MISS FRANCES CHALUFOUR and MISS MARIAN HUSSEY, pp. 6, 7. Issued October 3, 1923.

[2] DRURY, HORACE B., "Wages in the Coal Industry as Compared with Wages in Other Industries," *The Annals of the American Academy of Political and Social Science,* January, 1924, p. 315.

somewhat less hours per day and week than do the full-year day men.

The National Bureau of Economic Research made a study of employment hours and earnings during the years 1920-22. While the chief interest in this investigation seems to have been to ascertain the change in employment hours and earnings from the peak of 1920 to the depression of 1921, its conclusions as to earnings of employees may be of interest. "The average earnings in 1920 of persons who, in that year, worked in plants employing over one hundred workers, was $1,544. In 1921, because of unemployment, their earnings had fallen to $1,112, a loss of $432. Those persons employed in enterprises having fewer than twenty-one employees received only $1,121 each in 1920, but in 1921 their earnings had declined only to $1,077, a diminution of $44. Workers employed in concerns of intermediate size earned on the average $1,354 in 1920 and $1,222 in 1921." [1]

STATISTICS OF INCOMES OF THE PEOPLE OF THE UNITED STATES

Common observation and the available data both show that for the majority of adults in the United States annual earnings in the form of wages and salaries constitute practically the sole source of income. This is true particularly in regard to the low-wage groups. There are those, however, who obtain income from other sources. Hence we must examine such data on incomes as are available. The term income as used here implies, of course, no reference to what is often spoken of as real or psychic income, but is taken to mean "the net increase in the power to obtain commodities or property, which accrues to an individual, a family, or a business concern during a given period of time." [2]

The first of the available studies to be cited here is one contained in the comprehensive report of the United States Immigration Commission. This is of unusual interest because it furnishes us with data on the incomes of families rather

[1] King, Willford I., "Employment, Hours and Earnings in Prosperity and Depression." *The National Bureau of Economic Research, Inc.*, 1923, p. 144.

[2] King, *Wealth and Income of the People of the United States*, p. 113.

than of individuals. In this investigation, information was secured on the incomes in 1908-09 of 15,726 families, the heads of which were wage-earners in mines and manufacturing establishments. The average annual income of these families was $721. Of the entire number, 31 per cent had incomes of less than $500, 64 per cent had incomes under $750, 82.6 had incomes under $1,000, and 95 per cent had incomes of less than $1,500.[1] The only objection that may be urged to this report on family incomes is that of the total number of families included, more than four-fifths were foreign born. It is, then, hardly representative of the population of the country as a whole.

On the basis of various bits of evidence, King estimated the percentage distribution of incomes of families in the continental United States for 1910. Summarized, his results follow: [2]

TABLE VI

16.7	per cent	had	incomes	of	less	than	$	500
26.1	"	"	"	"	"	"	"	600
38.9	"	"	"	"	"	"	"	700
51.5	"	"	"	"	"	"	"	800
61.3	"	"	"	"	"	"	"	900
69.4	"	"	"	"	"	"	"	1,000
81.7	"	"	"	"	"	"	"	1,200
90.3	"	"	"	"	"	"	"	1,500
93.6	"	"	"	"	"	"	"	1,800
94.8	"	"	"	"	"	"	"	2,000

King is one of the several men responsible for the very careful and thorough study of distribution of the national income of the United States in 1918, made by the National Bureau of Economic Research. It should be noted that this is a study by persons, not by families. Family incomes, in the lower economic classes in particular, would average somewhat higher than the distribution by persons, since income in many cases is received from more than one member of the family. This study [3] shows the following distribution:

[1] *Abstracts of Reports of Immigration Commission, op. cit.*, Vol. 1, pp. 412-413.

[2] King, *op. cit.*, pp. 228-229.

[3] "Income in the United States," *National Bureau of Economic Research*, Harcourt, Brace & Company, New York, 1921, pp. 134-135.

TABLE VII

Annual Income Less Than	Cumulative Percentage of Persons
$ 600	9.5
800	22.4
1,000	38.7
1,200	54.5
1,400	67.1
1,600	76.0
1,800	82.0
2,000	85.9
2,500	91.4
3,000	94.1
4,000	96.6
5,000	97.8

Members of the staff of the bureau point out that these figures are not to be taken as more than an indication of the type of income distribution which prevailed in the United States in the year 1918.

SUMMARY

An effort has been made in this chapter to present, in chronological sequence, the wage and income data of the past several decades. During this period a considerable body of data has been gathered. It must be very apparent, however, to the reader that a good deal of progress in regard both to comprehensiveness and to improved statistical craftsmanship, needs to be made.

REFERENCES FOR FURTHER READING

Employment, Hours, and Earnings in Prosperity and Depression, National Bureau of Economic Research, 1923.

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CHAPTER V

A COMPARATIVE ANALYSIS OF FAMILY BUDGETS AND INCOMES

In the two preceding chapters, an effort has been made to set forth as impartially as possible the available data on the cost of standards of living and on the wages and incomes of the people of the United States. We are now in a position to attempt, first, an analysis of the various data cited, from the standpoint of their consistency with actual facts; and, second, a summary, on the basis of these considerations, of the classes or groupings of wage-earnings families, with reference to their economic circumstances.

AN ANALYSIS OF THE DATA

Variations in the Size and Composition of the Family.—It has been pointed out that budgetary studies have used as a rule the family of five, including three dependent children below the age of fourteen, in the determination of standard of living costs. It is well to remind ourselves that the representative character of a family of this size has never been established. That it is necessary for at least three children to survive per marriage in order to secure the perpetuation of the race, which is one of the reasons assigned for the selection of a family of this size, does not prove this to be the case at any particular time or place. According to the census figures for 1920, there were in that year not 5, but 4.3 persons per family in the United States.[1] Nor do the children in a family always remain under fourteen years of age. In 1920 there were enumerated 24,351,676 families and 33,612,442 children fourteen years of age and under. By the simple arithmetic of the case, there were then 1.3 children fourteen years of age and under per family. On the other hand, various statistical studies show that the birth rate is higher, and apparently consid-

[1] Abstract, *op. cit.*, p. 459.

erably higher, in the lower-income groups. As some one has put it, all the big families are in the small houses and the small families in the big houses. This means, then, that the families of wage-earners tend to be above the average in size.

Although the average size of wage-earners' families be above that of the entire number of families in the population, there remain to be considered the variations that obtain. Unfortunately, the various budgetary studies furnish us with little or no information on this point. Most of them selected their families because they met the preconceived notion of size. Such, for instance, is the case in so well done a work as Chapin's. Of all the schedules collected in his investigation, one-sixth were rejected because they contained less than four or more than six persons. Manifestly, it is not scientific to select families to fit a preconceived type. It is highly necessary that careful study be made of the variations in the size and composition of families in the wage-earning class.

From an investigation made in 1917-18 by the Seybert Institute in Philadelphia in six distinct industrial sections of that city, some interesting facts can be obtained bearing on the question under consideration. Information as to the number and age of children is available for 9,015 families. Of this number, 19 per cent had no children, 21 per cent had one child, another 21 per cent had two children, 15 per cent had three, 10 per cent had four, 6 per cent had five, and 7 per cent had six or more. Moreover, it is important to note that in but 55 per cent of the families were all of the children under sixteen years of age. Of the 4,971 families having children all of whom were under sixteen years, 30 per cent had one child, 30 per cent had two children, 18 per cent had three, 11 per cent had four, 6 per cent had five, and 4 per cent had six or more. Of the 9,015 families, but 932, or 10.3 per cent, had three children under sixteen years of age.[1]

Standard of living studies must recognize these variations. If it costs $1,800 for a family of five, including three dependent children, to maintain a normal standard, how much will

[1] Kingsbury, Susan M., "Relation of Women to Industry," *Papers and Proceedings, Fifteenth Annual Meeting, American Sociological Society,* Vol. XV, University of Chicago Press, Chicago, 1920, pp. 141-158.

it cost a couple without children, a couple with one child, with two, with five? An approximate answer to these questions must be found if we are to determine the cost of living for actual families and not merely for a hypothetical type. These facts, standing out in contrast to the assumptions of our budgetary studies, reveal the idealism which pervades them. It may well be that the family, socially considered, should be the family of five. It is necessary, however, to bring our budgets into contact with the facts of life, though at the same time we recognize that the facts should be altered.

The next point to be considered is that a good many more families pass *through* the stage when they have three dependent children than can be found having that number at any particular time. In the Philadelphia study just alluded to, while but one-tenth of the families at the time of the investigation included three children under sixteen years of age, an additional 23 per cent of them had passed through that stage before the time the information was secured. This leads us somewhat naturally to the next problem to be raised.

Over What Period of Time Should a Standard of Living Study Extend?—Budgetary studies as a rule cover rather limited periods of time, estimating the cost for a year on the basis of one or several months of study. More than twenty years ago, Edward T. Devine sounded a warning against this in words which bear repetition at this point: "It is not possible to obtain a clear conception of the prevalent standard of living merely by enumerating the goods which at any given time are in the possession of the families under consideration; it is necessary to follow their fortunes through an entire generation, or, what is equivalent, to consider the position of the children, the middle aged, and those of advanced years in the household economy. We must find out what happens in sickness, in hard times, and at times when there is a distinct reversal in the family fortunes. The family is on the right side of support only when, one year after another, in hard times as well as in periods of prosperity, they are able to remain independent; they must be able to provide insurance

against accident and death; they must be able to keep the children at school until they are physically and mentally ready for work; they must be able to obtain sufficient relaxation and recreation to prevent premature breakdown of the physical system. Those who do not have the expense of rearing children, and who are therefore deprived of support from their own offspring when grown to manhood, must lay aside, either in the form of insurance or in that of savings, enough to provide for their own old age.

"The standard of living, whatever physical comforts it includes at a given period of life, must be understood to imply an income which will take the individual of the normal family safely through the ordinary vicissitudes of life without reliance upon charitable assistance, although not, indeed, necessarily without mutual interchange of many courtesies and favors from friends and neighbors. If the income is earned not by the head of the family alone, but by the wife and one or more children, it should be larger in amount, other things being considered, than if it is due entirely to the earnings of the natural breadwinner, since there should be a deduction from the earnings of the children, even if of wage-earning age, to provide for their future household expenses; and, if the earnings are in part by the wife, there should be a deduction to provide for the assistance which under such circumstances should be given to the household work." [1]

Nearing puts the matter more trenchantly by comparing family accounts of wage-earners with those of business concerns. "Every successful business man tries to live up to the following well-established formula:

"First. He pays out of his total returns, or gross receipts, the ordinary costs of doing business—materials, labor, repairs, and the like. These payments are known as running expenses, or up-keep.

"Second. After up-keep charges are paid, he takes the remainder, called gross income, and pays out of it the fixed charges—taxes, insurance, interest, and depreciation.

[1] Devine, Edward T., *Principles of Relief*, The Macmillan Company, New York, 1907, pp. 33, 34.

"Third. The business man, having paid all of the necessary expenses of doing business (the running expenses and the fixed charges) has left a fund (net income) which, roughly speaking, is the profits of the business. Out of this net income, dividends are paid, improvements and the extensions of the plant are provided for.

"Fourth. The careful business man increases the stability of his business by adding something to his surplus or undivided profits.

"Every modern business man disposes of the total receipts of his business in some such way as that indicated. The business man who cannot pay his running expenses, fixed charges and dividends, and show some surplus, is scanned critically. Should he fail to pay dividends, he is considered unprosperous. If he does not meet the interest on his bonds, he is taken into court and declared a bankrupt. Running expenses, fixed charges, dividends, and surplus are not merely fair; they are essential to business success. They are considered a 'right' by the organizers of every legitimate business." [1]

Suppose the wage-earner should apply to the financing of his family this financial formula. He would proceed as follows:

"First. He would pay, from the total family income, the family running expenses—food, clothing, housing, medicine, and the like.

"Second. From the remainder, his gross income, he would take interest on the investment which has been made in bringing up and educating his wife and himself; insurance against all reasonable contingencies, such as sickness, accident, death, and unemployment; and a sum for depreciation sufficient to compensate for the inevitable decrease in his earning power, and for the old age during which he and his wife can no longer earn anything.

"Third. The remaining net income should be sufficient to enable the worker to pay himself dividends proportionate to the excessive risks which he runs in bringing a family into

[1] Nearing, Scott, "The Adequacy of American Wages," *The Annals of the American Academy of Political and Social Science*, Philadelphia, May, 1915, p. 119.

the world and attempting to rear it; and sufficient to add at least something to the surplus which the family lays aside to provide against such untoward events as births, deaths, and prolonged sickness.

"The workman who conducted his affairs on this basis would be a sound, sane, safe financier. He would also be a seven-day wonder." [1]

Of significance at this point is Rowntree's theory of the alternating periods of want and comparative plenty in the life of the English laborer—three periods of poverty and two of comparative plenty. Unless his father is a skilled laborer, he will probably be in poverty during early childhood, when his constitution is being built up. This will continue until he and his brothers and sisters begin to earn money, thus increasing the family income to a condition of comparative plenty. This prosperity lasts until he marries and acquires two or three children. Thus he will fall below the poverty line again in early middle life, when he should be in his prime. This second period of poverty continues until his children grow up and begin to earn. Then follows the second period of comparative plenty, lasting until his children leave home and old age overtakes him, when he falls into poverty for the third and last time. It is questionable whether these periods are so definitely marked in the life of the American laborer, but some similar succession of periods of poverty and prosperity undoubtedly marks the life of many American wage-earners and their families.[2]

All three of these men emphasize this one fundamental fact —that it is the long run of life with all of its varied contingencies rather than the brief survey which must be taken into account in determining the cost of living standards and the adequacy of family incomes.

THE PRINCIPLE OF THE LIVING WAGE

Interest in standards of living and their costs originated primarily in the study of poverty. Subsequently, with the

[1] *Op. cit.*, p. 120.

[2] Rowntree, B. S., *Poverty*, The Macmillan Company, London, 1901, pp. 136-137.

development of efforts to establish minimum wages for women workers, the various commissions accepted this method as the basis for their recommendations. Finally, during the period of the war, when prices were rising and frequent wage adjustments became necessary, the standard of living became the recognized factor in the revision of wage rates. Although the use of this factor has declined temporarily during the last year or two, it may be said in general that it has become quite customary to select some standard of living figure and to contrast with it the wages paid to adult males, to determine to what extent a "living wage" is paid. Such a comparison, made on the basis of the data in Chapters IV and V, shows that a "living wage," thus conceived, does not now, nor has, prevailed to any extent in the United States. Much has been made of this disparity between living costs and wages by students of a certain temperament. The impartial analyst, interested in facts and not in propaganda, will appreciate that such comparative contrast of the data requires a somewhat more searching scrutiny.

In the first place, it is questionable to what extent existing standard of living studies are adapted for such use. Miss Margaret Stecker has pointed out[1] the different purposes for which these studies have been made. "The cost and standard of living have been studied in connection with investigations of factors entering into international trade; to determine the living conditions of wage-earners; to provide standards of normality for the administration of poor relief, as companion studies to wage investigation; and to secure a basis for the establishment of minimum wage rates. The earlier studies were made on broad lines, and such conclusions as were drawn were usually qualified to safeguard their specific use. . . . A number of the later studies aimed to establish an ideal standard and did not purport to be a measure of the prevailing cost of living. So far as is known, up to the period of the World War no extensive use was made in this country of family budgets for the purpose of adjusting wage rates, although

[1] Stecker, Margaret L., "Family Budgets and Wages," *The American Economic Review*, Cambridge, Mass., September, 1921, pp. 447-448.

they were often used by relief agencies as a criterion of the support being given to dependent families." In other words, "the extensive use of family budgets as a basis for establishing wages is a new thing in this country, and the attempts to adapt for this purpose budgets collected a number of years ago for a very different purpose is putting them to a use which raises a number of serious questions."[1]

Professor W. F. Ogburn has called attention to several other difficulties in the use of standards of living in the determination of wages. "In the recent wage adjustments in the coal industry and in the railroad industry, it was quite evident that there was much confusion in the mind of the public over the standard of living budgets. This confusion arose from the fact that there are several different levels of living and not just one standard of living. Two of these levels of living have been particularly well studied. They are the minimum-subsistence level and the minimum-comfort level.[2] The minimum-subsistence standard of living is supposed to provide just a bare subsistence. . . . It is that wage that is thought of when we speak of requiring industry to pay a living wage and say that otherwise it is parasitic and ought not to be permitted to exist.

"So drastic a policy has never been urged for the minimum-comfort wage, however desirable it may be socially to raise the standard of living. Condemning an industry for not paying a living wage depends upon what living wage, whether the minimum-subsistence wage or some higher level, is meant. Very frequently the minimum-comfort wage has been erroneously called the minimum-subsistence wage.

"Another use of standard of living figures that has made it seem impractical is the tendency to apply standards worked out in one locality to another and different locality. It is frequently said that it costs a certain sum for a family of five to live in the United States today. There is, of course, not just a single cost for the United States. There are many, varying from locality to locality.

[1] *Op. cit.*, p. 465.

[2] The U. S. Bureau of Labor Statistics generalized Ogburn's comfort standard in 1920 and calls it a "health and decency minimum."

"Just how great a variation there is between different regions cannot be told without special investigation. But from the data collected by the United States Bureau of Labor Statistics from all regions of the United States, the difference in cost of living according to sections of the nation appears to be slight; perhaps it is a little lower on the Pacific coast.

"The variability is somewhat greater, however, by size of the particular locality. The cost of living in the very large city is not greatly different from the cost of living of the large city. But there seems to be a good deal of difference between the cost of living in the large city and that in the small town or village. We have little statistical data concerning cost-of-living standards on the farm. But whatever these differences may be, it should be remembered that there are these variations. The best way of finding out is by special cost-of-living surveys, but of course those are expensive and take time. It is quite possible, I think, for some such agency as the United States Bureau of Labor Statistics to establish differentials according to locality which would very probably be stable over time. . . .

"When an industry extends over many different localities, variations in levels of living present obstacles to uniformity in wages, if the standard of living is taken as a basic factor. There is, however, such a thing as regional wages." [1]

The Living Wage and the National Income.—It is interesting, as well as imperative, to analyze, from the standpoint of the national income, this rather loose practice of selecting the amount necessary to maintain the higher standard levels, without regard to locality, and demanding that it be made the minimum or "living wage" for adult workers. Is it possible? Does the national income permit? To make budgets without discussing income is as rash in public as in private life.

In 1920, approximately $1,700 was needed in our larger cities to maintain a health and decency standard, and about $800 a year for the woman worker living away from home.

[1] Ogburn, William F., "The Standard-of-Living Factor in Wages," *Papers and Proceedings, Thirty-fifth Annual Meeting, American Economic Association,* published as a supplement to the *American Economic Review,* Vol. XIII, No. 1, March, 1923.

"Now, excluding the million employed children, there were in that year 26.7 million adult males who were gainfully employed, 6.4 million adult women, and 5.5 million juveniles from fifteen to twenty, approximately two-thirds of the last being boys. Had these men and women been paid the minimum amounts indicated by the various studies as necessary, with the lads and girls given, respectively, only half as much as their seniors, the payment of this minimum above would have demanded approximately 57 billion dollars. Yet, according to the very careful estimation of Dr. Mitchell and his colleagues, the total income for the previous year amounted to but 66 billion dollars.

"For 1920 it was of course considerably less; not more than 60 billion at the outside, and probably even less. After making all allowance for the fact that the estimate of 57 billions is somewhat excessive because of the lower cost of living in agricultural regions, and also for the fact that the payment of such a wage might serve to increase the national income itself, it is probable that the margin left is altogether insufficient for (1) the differential wages above the minimum for those with greater manual or mental skill, (2) interest upon invested capital, (3) rent, (4) somewhat overlapping the previous three items, a fund for savings, the annual amount of which Mr. King places from 12 to 16 per cent of the national income."[1]

Whatever modifications one might be inclined to make in this reckoning, it is clear that the exigencies of national bookkeeping reinforce Ogburn's contention that it is the minimum-of-subsistence level that must be used in connection with the concept of a living wage, and not the higher level, as is frequently done.

THE COMPOSITE FAMILY INCOME

The traditional concept of the "normal family group" is that of a father and mother, with their functions of breadwinner and home-maker, respectively, and the children, the

[1] Douglas, Paul H., quoted from Atkins and Lasswell, *Labor Attitudes and Problems*, Prentice-Hall, New York, 1924, pp. 300-301.

entire group living on the earnings of the father. It is upon this concept that the principle of, and demand for, a living wage is based. Does this concept adhere to the facts? Does the normal family group in the United States consist of a man who is the sole wage-earner, a woman who is the home-maker, and the children, all living on the earnings of the father?

These questions must be answered in the negative. Perhaps less than half of the wage-earning families, according to authoritative statistics, depend entirely upon the earnings of the father. With the exception of the families whose heads are engaged in occupations where wages are considerably above the average, the evidence shows that the larger the family income the greater the proportionate contributions from other sources. The conclusion is inevitable that the earnings of the father in the ordinary family are insufficient to maintain the standard of living that actually prevails.

Let us turn to examine some of the evidence upon which these statements rest. In 1920 there were 41,614,248 persons ten years of age and over gainfully employed. With a total of 24,351,676 families, there were, then, seventeen persons employed for every ten families—*i.e.*, almost two persons per family. Of those persons gainfully employed, 29,745,990 were males twenty years of age and over, and 6,775,827 were females in those age groups. For every ten families, it appears that there were gainfully employed about twelve men and three women, twenty years of age and over, in other words one and a half adult wage-earners per family.

There are a number of special studies which show not only the extent to which the fathers' earnings are supplemented, but also the chief sources of the additional family income. A few of these studies will be summarized briefly here.

An investigation by the Massachusetts Bureau of Statistics of Labor of the incomes of 152 families, whose average total income was $877, shows these incomes to come from the following sources in the proportions indicated:[1]

[1] *Thirty-second Annual Report*, Boston, 1902, p. 285.

Sources of Income	Percentage of Total
Earnings of head	67.67
Contributions from minor children	11.32
Received from boarders and lodgers	9.92
Received from other sources	11.09
Total income	100.00

Unfortunately, there is in this study no indication as to how much was contributed by the wife and mother.

In the Federal Bureau of Labor investigation, made around 1901, it was found that the incomes of 25,440 families came from several sources in the proportions indicated in the following table: [1]

Sources of Income	Percentage of Total
Husbands	79.49
Wives	1.47
Children	9.49
Boarders and lodgers	7.78
Other sources	1.77
Total income	100.00

The British Board of Trade made an investigation into the cost of living in this country between the years 1905 and 1909, in the course of which it studied the composition of family incomes in the different income groups. The table at the top of page 89 shows the percentage of the family income earned by the children in different income groups.[2]

It is apparent from this table that as the size of the family increases the family income increases. The increase in the percentage of the family income contributed by the children indicates that the family income increases largely because of that fact. Chapin in his investigation found a similar tendency for the percentage of the total family income earned by the children to increase as the family income increased.[3] The conclusion is rather definitely confirmed by the study of the U. S. Bureau of Labor Statistics, made in 1918-19, and

[1] *Eighteenth Annual Report*, Washington, 1904, p. 58.

[2] "Report of British Board of Trade on Cost of Living in the Principal Cities of the United States," *Bulletin, U. S. Bureau of Labor*, March, 1911, p. 541.

[3] CHAPIN, *op. cit.*, p. 63.

Weekly Family Income	Number of Families	Number of Children at Home	Average Weekly Family Income	Average Weekly Earnings of Husband	Percentage Contributed by Children
Under $9.73	67	1.78	$ 8.76	$ 8.16	2.1
$ 9.73 and under $14.60	532	2.06	12.42	11.53	3.3
$14.60 and under $19.47	1,036	2.46	16.99	15.16	5.4
$19.47 and under $24.33	545	2.88	21.51	17.14	12.5
$24.33 and under $29.20	437	3.07	26.10	19.11	16.9
$29.20 and under $34.07	224	3.63	31.38	19.14	30.
$34.07 and under $38.93	131	3.82	36.13	19.98	32.4
$38.93 and over	243	4.20	50.33	22.34	47.7
Total Number of families,	3,215				

covering 12,000 families. It was here found that in the group of families with incomes under $900 a year, 94.2 per cent of the family income was contributed by the father, while in families with incomes above $2,500, less than two-thirds (64.4 per cent) was contributed by the father. In the lowest income group, 7.8 per cent of the families had income from their children, in the highest income group (above $2,500) 71.1 per cent of the families derived income from this source.[1]

Reference has been made several times to the study made by the Seybert Institution in Philadelphia in six industrial sections of the city. This survey supplies some significant data for the subject under discussion.

Support of Families in Industrial Sections of Philadelphia[2]

	Number	Percentage
Total	11,073	100.0
Families supported by husband alone	5,025	45.4
Families in which husband's income is supplemented by that of other members	3,990	36.0
Families in which the husband is not working	353	3.2
Families in which there is no husband	1,705	15.4

If we eliminate the 2,058 families in which there is no hus-

[1] *Monthly Labor Review*, December, 1919, pp. 29-41.

[2] Kingsbury, *op. cit.*, p. 143.

band or in which he was not working at the time of the investigation, the next table indicates the extent to which the husband's wage is supplemented: [1]

Sources of Supplementary Income	Number of Families	Percentage
Total	9,015	100.0
No supplementary income	5,025	55.7
Wages of children	1,317	14.6
Wages of wife	1,087	12.1
Revenue from lodgers	1,089	12.1
Wages of children and wife	153	1.7
Wages of children and revenue from lodgers	186	2.1
Wages of wife and revenue from lodgers	139	1.5
Wages of children, wife, and revenue from lodgers	19	.2

It is significant to note that the father is solely responsible for the support of his family in less than one-half (45.4 per cent) of the families interviewed. "If we base our budgetary discussions on a household sustained by the father alone and composed of father, mother, and three children, we are assuming the ideal, since only 788 families, less than 9 per cent of the total of 9,015, are actually of this type." [2] It is also clear that the average wage-earner's family income is to a large extent composite, and is derived from earnings of the wife and children and from the keeping of lodgers and boarders, as well as from the wages of the husband.

One may not consider the development of such sources of income to the best interests of society, but our immediate concern at this point is to determine the ability of wage-earning families to measure up to prevailing levels of living.

Uncatalogued Income.—How many persons or families know what their cash incomes are? Even if an accurate account is kept of all moneys received, what about receipts which have a cash value but which are not noted or translated into monetary units? There are numerous sources of income that will here be called uncatalogued.

Most persons, for instance, receive gifts from friends and relatives. Such gifts are of all kinds and of all values. Holiday and natal-day gifts at once suggest themselves. But

[1] KINGSBURY, *op. cit.*, p. 144.
[2] *Ibid.*

beyond these there are a host of others which the average individual receives. They may take the form of cast-off clothing, of visits to other families, of services rendered by others. Any lengthened reflection on the part of the reader will suggest many concrete instances of gifts given and received, which may have a rather direct cash value.

Since this is an actual enumeration rather than an ethical discussion, it is necessary to add theft as a source of income. There undoubtedly goes on constantly and in all circles of society a very great deal of petty thieving, ranging from systematic shoplifting to the filching of farmers' produce, books from the library at a university, instruments from its laboratories, or cakes of soap from the hotel bathroom. Anyone familiar with a business in which employees handle moneys knows how widespread is the practice of diverting cash receipts from the drawer of the employer into the pockets of the employee. Intimations from railroad companies suggest tremendous losses through theft of goods shipped by freight. The organized looting of coal cars in transit, for instance, is an established practice. The American Railway Association estimates that 25 million dollars' worth of freight is stolen annually in transit.

Akin to the source just mentioned is the habit of certain persons to refrain from the payment of bills. How common this practice is, no one knows. An effort to determine the facts would make an interesting treatise. If common report may be trusted at all, one must be prepared to find traces of it among all classes and in unexpected places. Certain families appear to specialize in the systematic scattering of bills so small in amounts that refusal to pay does not warrant coercive measures. It would be an interesting psychological study, too, to analyze that peculiar type, perhaps not so infrequently found as is supposed, who make more effort to escape the discharge of just obligations than would suffice to earn the money for their payment.

In this connection might be considered also the whole question of graft. Conspicuous illustrations of individuals profiting from this source immediately suggest themselves, and the

term is associated usually with such instances, chiefly among men in political life. But the thing itself is a much more extensive phenomenon; just how extensive no one can say because of the difficulty of getting the facts. It is significant to recall in this connection the rather general indifference on the part of the public in regard to the recent oil scandals, involving some very high officials of the federal government. It would appear as though many, by far too many, citizens have become callous to corruption in higher places by reason of their constant repetition, and to have accepted the creed of each man "getting his." Apparently, graft pervades all classes in society. The self-styled solicitor for some presumably worthy cause who exploits a merchant's unwillingness to appear as opposed to that cause; the head of a charitable institution who trades to his personal profit on the popular appeal of the work with which he is identified; the friend of the home-building couple who influences the selection of the contractor upon promise of a consideration from the latter—these and many other varieties differ in degree but not in kind from the public official who commercializes his position to his own advantage.

There is, too, a considerable amount of clandestine prostitution. The woman practicing this kind may be either married or single. She lives with her family, usually appearing virtuous enough. Her lapses are occasional and in a sense incidental, in some cases for money, in others a matter of so-called "charity." It is meant here merely to call attention to the type and as a source of possible income. One knows, for example, of industrial towns where the nature and hours of the prevailing occupations of large numbers of husbands make it possible for wives and daughters to supplement in this way the family income with considerable regularity.

The gathering of fuel on the streets and elsewhere free of cost is practiced extensively, particularly in the lower-income families, and must be included as a form of uncatalogued income. Chapin reports[1] that half (51 per cent) of the $600-$699 familes and more than one-third (35 per cent) of the

[1] Chapin, *op. cit.*, p. 115.

$700-$799 families gathered fuel on the streets. In most of these cases the fuel gathered consisted of boxes thrown out by merchants, coal in the neighborhood or coal-yards, or waste material from building operations or wood-working establishments.

Just how many families receive income in the form of produce from the cultivation of gardens and small tracts of land it is impossible to say. Forty-seven per cent of all families in the United States in 1920 lived in places classified as rural, and it is safe to say that nearly all of these had at least some opportunity to supplement their incomes in this way. The larger in size the city in which the wage-earner lives, the less ordinarily would such opportunities be, although it will be remembered that during and since the period of the war there has been a considerable development of the cultivation of vacant lots within and adjacent to city boundries. An investigation by the United States Public Health Service in South Carolina showed that in 1917 families of cotton-mill workers derived about 12 per cent of their incomes from miscellaneous sources. This is considerably higher than the percentage of income from investments as revealed by several studies, and is due probably to the fact that these mill workers live for the most part in villages where it is easy to raise gardens and keep cows.[1] Ogburn calls attention, in the passage quoted previously in this chapter, to the dearth of data concerning the cost of standards of living among the rural population. This applies likewise to the smaller towns which, according to the distinction made by the census, are classified as urban.

It will be understood, of course, that in calling attention to these sources of what has been termed uncatalogued income, they are presented as supplementing the incomes of particular individuals or families, and not, with the exception of the last named, as additions to the sum total of the national income. Nor, it is hoped, will this attempt to analyze somewhat critically the available data on family budgets and incomes confuse unduly the reader. The problems of human life, however, and especially when large groups of people are

[1] *Income in the United States,* p. 106.

involved, are seldom so simple as some students seem to imagine, and if, ultimately, the facts of social and economic welfare are to be determined with scientific approximation, it can be only on the basis of a frank recognition of the need for that more accurate and complete information which further researches must yield.

THREE CLASSES OF WAGE-EARNING FAMILIES

Bearing in mind the considerations emphasized in this chapter, caution must be exercised lest too much in the way of conclusion be drawn from a comparison of data of standards of living and family incomes. It would seem, however, that one is warranted in pointing out the existence in our wage-earning population of three rather definite groupings or classes of families, on the basis of their economic circumstances, which are of vital interest and importance in the study of social well-being.

I. *Families at the Poverty Level.*—There are those families whose incomes are so small that they cannot measure up to the prevailing standards of their communities. They live at or below what was spoken of in Chapter III as the poverty level. What proportion of families are in this class it is difficult to say. It varies from time to time and from place to place; somewhere between 15 and 25 per cent seems a conservative estimate for the entire population in recent years.

Among the characteristics of such families are undernourishment, overcrowding, deterioration of household equipment and clothing, and liability of acute distress with any minor disturbance of the daily equilibrium. There is some evidence to show that these conditions fall the least hard on the husband, and harder on the wife and children. The only records of expenditure for which we have individual accounts is clothing, and when the standard of living falls, the standards of clothing for the wife are the first to be sacrificed. The reader need but recall the infantile death-rate studies made by the Children's Bureau, reference to which is made in Chapter II, for an instance of what low income may mean to the children born in these families.

The workers in these families constitute the underpaid group in our economic organization. They are for the most part unorganized, and for this reason have not shared in the general gains that organized labor has made in recent years. What has just been said must not be taken to mean that wages are invariably high in organized, and invariably low in unorganized, tades. As a matter of fact, among the most puzzling facts in industrial relations are the differences in earnings from labor.

Two facts in this connection, however, must stand unchallenged. One of these is the existence of a definitely underpaid group. Certain organized interests are eager to divert attention away from it, and considerable propaganda regarding other aspects of the matter has at least as one of its motives such diversion. The other fact is that "poverty, in its practical aspects, is a phase of the wage question. Large bodies of toilers are in receipt of incomes less than enough to maintain wholesome existence, and it is from this class that the mass of the poor are mainly recruited. This conclusion does not overlook the misery-breeding effect of an unfavorable social environment and an inadequate public service." [1]

There is, of course, no social justification whatsoever for the existence of underpaying industries. "The workers in such a trade are supported either by their families, and so indirectly by the better-paying industries, or by society as a whole in the form of community charges entailed by the physical and moral deterioration of the underpaid. These industries are properly described as parasitic. They afford a limited class of consumers an unfair advantage over the general community, with attendant misery and wretchedness to the wage-earners involved. It is as economically unsound for a body of toilers to be exploited in behalf of a group of consumers as in the interests of a monopoly-intrenched employer." [2]

II. *Families with Minimum-Subsistence Incomes.*—A large number of wage-earning families, perhaps as many as one-third, have incomes which tend to suffice for the needs of

[1] HOLLANDER, *op. cit.*, p. 46.
[2] *Ibid.*, pp. 67-68.

animal existence but which allow little or nothing for the social requirements. This has been referred to as a minimum of subsistence standard of living. These families are therefore constantly confronted with the necessity of choosing between these two kinds of needs. The tendency in the majority of such families seems to be to meet the social requirements—at the expense of physical needs. Life for them is largely a struggle to maintain appearances.

Illustrations of what this struggle involves in the way of choice in the consumption of commodities will serve also to suggest their far-reaching social significance. Rent, for example, is given consideration prior to food, because living quarters more than diet advertise to neighbors and friends the family's economic circumstances. Underfeeding, and overcrowding, too, inevitably result. Some of the earlier budgetary studies which concerned themselves with actual rather than standard budgets [1] show that, in the very low income groups, with an increase in the family income there is an increase in the proportion of the income spent for food up to a given point; that beyond that point, as the income increases, the proportion spent for food tends to remain constant until another given point is reached. This increase in the amount spent for food (for the amount increases even if the proportion remains constant), as does, of course, the earlier increase in proportion, plainly indicates underfeeding below that point.

Another way of establishing the same point is to see what happens during a rise in prices. Professor M. E. Jaffa, of the College of Agriculture, University of California, in discussing the rise in prices of commodities during the period of the war, says: "The higher prices have in all probability been met by a reduction in the food supply of the family. Rent must be paid, shoes and some little clothing must be bought, other incidentals must be met, but food, which is the largest single item of expense and is susceptible of manipulation, can generally be reduced." [2]

W. Jett Lauck, in commenting upon the dietary changes

[1] Cf. Ogburn, *op. cit.*, p. 120, for full explanation of distinction.

[2] *Bureau of Applied Economics*, p. 125.

following high prices, points out: "If a family has had a large income and has been in the habit of purchasing high-grade articles of food, advances in the cost of foodstuffs would probably be met by purchasing less high-priced and more medium-priced articles. There will be a falling off in the nutritive value of the family diet. Families of moderate incomes which had been consuming medium- and low-priced foods, under a period of rising prices would purchase less of the medium and more of the low-priced foods. . . . Advances in cost of staple food are a positive danger to the families of low incomes. These families under normal conditions are forced to buy cheaper foods. When there is a general rise in the price level, they cannot substitute a cheaper food of the same nutritive value. They are compelled to consume cheaper foods, but these articles do not contain the food values to which they have been accustomed. Beans or eggs cannot be substituted for meat. So far as these families are concerned, their normal diet constituted an irreducible minimum so far as their nourishment is concerned. Higher prices, without a corresponding advance in income, means to them under-nourishment and under-development, with greater liability to disease and all the other dangers which the term applies." [1]

In the winter of 1917-18, Dr. Harris, of the Department of Health of New York City, made a survey of 2,000 families whose standard of living had been reduced, and his data show what happens in addition to dietary changes when real wages fall. "Of Dr. Harris's 2,000 families 9 per cent sought charity for the first time. In 9 per cent of the families, women went to work for the first time; 18 per cent of the families went into debt as a direct result of the lowered real wages; 6 per cent took in boarders, never having taken in boarders before; 2,000 cases of illness were recorded, an average of one per family; 13 per cent of these cases of illness were definitely retarded because of the low standard of living; 37 per cent of the families eliminated meat from their diet, and in 17 per per cent more the amount of meat was reduced. In 40 per

[1] Lauck, W. Jett, *Cost of Living and the War,* The Doyle and Waltz Printing Company, Cleveland, 1918, p. 3.

cent of the families eggs were eliminated from the diet; in 30 per cent, butter; 6 per cent gave up sugar; and, what is perhaps worst of all, 300 families gave up bottled milk because of the fall in real wages. It seems very probable that when the standard of living of poorly paid laborers is lowered, sacrifices and adjustments must follow somewhat along the lines recorded by Dr. Harris in his data of 1917-18." [1]

It is plain to see the tremendous importance of recent increases in rentals. Writing of the situation in Philadelphia in the summer and fall of 1924, Karl de Schweinitz, secretary of the Society for Organizing Charity, says: "It is virtually impossible today for a poor family to get a decent place to live without paying an exorbitantly high rental. There are many instances of persons already existing close to the starvation line who suddenly find their rents raised to $35 and $40 a month. To make it worse, this increase takes place immediately and there is no chance for the families affected to try to adjust themselves to the situation or look for another home. It is a case of pay or get out, and when they get out they find it equally impossible to find another place to live. There used to be a time when a landlord would accept credit for the worker who was temporarily ill or had lost his job. The grocer, butcher, and other shopkeepers will often extend courtesies to the unfortunate to tide over some adverse fortune. Not so the landlord today; he demands his money immediately, and in advance. Sometimes, with the rent only overdue a few days, it is a case of clear out." [2]

None of the above quotations mention the matter of clothing, but it must be apparent that, particularly in the case of members of the family employed outside of the home, clothing, because of the direct social and psychological effects, is apt to be given preference over other items in the budget. The shopgirl who limits her lunch to a roll and a cup of coffee, and by so doing makes possible after several weeks the purchase of a new hat, may be robbing the body machine of fuel necessary

[1] Harris, L. I., "Some Medical Aspects of the High Cost of Living," *The American Journal of Public Health*, July, 1919, quoted from Ogburn, p. 123.
[2] de Schweinitz, Karl, in the *Philadelphia Evening Ledger*, September 24, 1924.

for its continued operation, but the fact remains that, confronted with the necessity of choosing between conflicting values, she gives priority to that which she considers the more important. Or, continuing by way of illustration, there will be a maintenance of outer at the expense of under garments. This may mean that in colder weather too much bodily energy is utilized in maintaining the normal temperature of the body, not leaving enough for other physical exertions. Moreover, outer garments will be selected, not for service, but for show. If there is any foundation for the New Psychology, it offers an excellent explanation of the bizarre and unphysiological nature of much of our modern attire.

Again, proper medical attention is apt to be delayed unless and until the effects are serious and direct. The economy of preventive medicine is not practiced. Teeth will be neglected, although our present knowledge magnifies their importance for physical welfare. Recreation which re-creates is omitted under the pressure of necessity. Worry over low income unfits for its increase or even its maintenance. The women of the household seek employment, with a subsequent neglect of home-making. The delicatessen husband and family are established facts. Bad home-making leads to results moral as well as dietary. Children, prematurely weighed down with the burdens of life, hasten to leave school at the earliest possible moment and go into blind-alley jobs. Lodgers swarm in the household, endangering the moral and social fabric of the home.

It is easy enough, from the outside, to condemn such preferences in the consumption of goods as penny wise and pound foolish. We must not, however, assume families to possess superhuman will power or extraordinary rationality. We must take human nature as we find it. Psychological needs are not entirely secondary to those more purely physical. In fact, the desire for social approval is as integral a part of our natures as is the desire for bread, and it is as necessary for a family to maintain its self-respect as it is to be adequately fed. To give preference to the latter in an abstract discussion is somewhat different from making that selection when personally

confronted by the problem. The actual choice of human families rather than the insistence of the moral philosopher is the fact with which we have to reckon.

It is a cruel dilemma—this constant conflict between psychic satisfaction and physical efficiency, further complicated by the difference between the immediate and the ultimate effects. It is this latter distinction, with its train of social consequences, which is the essence of what we term the vicious circle of poverty.

III. *Standard Families.*—This group comprises the large middle class of the wage-earning population. It is this group which establishes the norms of decent living, and it is their standard which the ordinary person has in mind when reference is made to the expression "standard of living," and which recent budgetary studies have referred to as a subsistence-plus or health and decency standard.

In view of the tendency, already alluded to, to make this standard as high as income permits, and that representative standard the irreducible minimum, it follows that the families in this group are able for the most part to meet the requirements of this standard—*barring the exigencies of life.* When fortune smiles, with steady work and good health, without accidents or serious calamities, this standard is maintained, in many cases with some slight surplus.

But life is a matter of peculiar uncertainty. Its exigencies will not down. Always they appear, in some cases with uncanny regularity, in others not for years but then with dire rapidity. A considerable part of the work of relief societies is to tide families over these exigencies of everyday family life.

The line between these classes of families cannot be sharply drawn in all cases, and there are other income classes of which no mention has been made. The three presented appear, however, as rather definite types, and of direct importance in our study of social well-being. It ought to be clear from what has been said that the economic insufficiency which we usually speak of as poverty is not a problem of the conspicuous and dramatic cases of obvious and urgent need. Rather is it the problem of that much larger element in society who make

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every effort to keep their condition from being known, who labor as is their wont through days "devoid of ease" to attain to that elusive thing which they call normal living.

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CHAPTER VI

SOME POSSIBILITIES FOR WAGE-EARNERS

One other aspect of the problem of family budgets and incomes needs to be considered. What have the wage-earners done, other than has been suggested already, to improve their economic circumstances? In what ways have they sought to reconcile family incomes and the cost of normal standards? What promising programs have been brought forward? These questions present themselves to the student. Manifestly, any attempt to answer them in a comprehensive manner is impossible within the scope of this volume. All that can be done is to indicate in brief manner the more important measures that are being considered, it being understood that the brevity of discussion is by no means due to any lack of appreciation of their far-reaching significance.

INCREASING INCOMES THROUGH MORE EQUITABLE DISTRIBUTION

Speaking generally, the most effective aid for those below a normal standard of living lies in the increase of income. "Apart from its efficacy, it is the procedure most consistent with personal independence and individual self-respect. Social workers have often noted the languid interest, sometimes the vague resentment, entertained by wage-earners against projects of paternal aid and welfare work—even extending to an attitude of relative indifference to the enactment of favorable labor legislation. The explanation lies in the workingman's deep-rooted conviction—the product of long and bitter industrial experience—that the well-being which comes to him in the form of increased earnings is more substantial for the present and more promising for the future than either the philanthropically inspired benevolence of his employer with its restraints and involvements, or the final resort of legal enactment with its delays and uncertainties." [1]

[1] Hollander, *op. cit.*, pp. 47-48.

The American Attitude.—This predominance of interest in immediate increased earnings is more characteristic of American than of European wage-earners. The difference between the two, which is entirely one of relative emphasis, may be expressed concretely in the following manner. The typical American family with an income of $1,500 a year, finding that $1,700 is necessary for the maintenance of what it deems a normal standard of living, will consider ways and means of increasing its income to $1,700. Confronted with a similar situation, the typical European family will give prior consideration to the possibilities of reducing the family expenditures to $1,500 through economies of consumption. Because of the much-vaunted prosperity of his country, the American assumes that the national dividend is abundant and to spare, but that the mechanism by which the individual share is determined is socially unsound, or that the mode, while sound in itself, is perverted by impeding forces. It is his belief, and it has been the prevailing opinion in the United States up to the present time, that our foremost and fundamental economic problem is that of a more just and equitable distribution of the national income. Whether this assumption is correct will not be challenged for the moment. Since the wage-earners accept it, their consequent conduct is not affected by its truth or falsity. It is what men believe to be true, not necessarily what is true, which determines their course of action.

The Organization of Labor: Its Prime Purpose.—Because most wage-earners have this interest in increased incomes in common, and since modern industry masses the workers together, both while at work and where they live, organization for this purpose inevitably ensues. From small and hesitant beginnings, made in the face of strenuous opposition and misrepresentation, organized labor has become a world movement of extraordinary numerical strength. Trade unions in the United States at the present time claim in excess of 6,000,000 members, an increase of 200 per cent within two decades. Basing their estimates on a family of five, trade-union leaders state that this membership represents almost 30,000,000 of

the total population. In Great Britain, close to three-fourths of the adult wage-earners are now organized.

Thus far, certain groups of laborers in this country have been thought to be unorganizable, due to their low mentality or volatile temperament, the continuing, even if now decreased, influx of immigrants, and various other reasons. It by no means follows, however, that a class of workers now unorganized will remain so, and it is safe to say that as time goes on an increasing proportion of American wage-earners will seek to achieve their ends through some form of labor organization.

"The replacement of individual by collective bargaining in wage adjustment is the prime purpose of contemporary trade-unionism. Such was not always the original design, and to it have certainly been added other significant activities. But collective bargaining is, after all, the dominant concern; whatever else a labor organization attempts is in reinforcement of this device.

"The necessity for concerted action on the part of the laborer has been recognized almost from the beginning of sound thinking in the field of economic distribution. Even before the advent of capitalism and the factory system, Adam Smith noted that 'tacit, but constant and uniform combination' of employers, and the consequent disadvantages of unorganized workmen in wage disputes. With the repeal of combination laws a generation later, a narrow economic philosophy sought to justify the contemporary disadvantage of wage-earners in industrial bargaining by the concept of a wage fund, with its implication of a rigid predetermined rate of wages that neither trade-unions nor collective action could affect. The reaction came, first, in admission of the actual achievement of trade-unionism, then in recognition of its tactical necessity in wage bargaining, culminating in radical reconstruction of the theory of wages. From the time of Longe and Thornton, 'the verdict of the economists' has been virtually unanimous in insisting that a necessary assumption of free competition in wage contracting is the organization of labor for purposes of collective bargaining. This has not

involved approval of all the policies nor the indorsement of many of the devices of modern trade-unionism. But there is essential agreement as to the primary contention, that collective bargaining is necessary for the workman to secure as wages at least that part of the product of industry which free competition tends to award him." [1]

Kinds of Action Utilized by Organized Labor.—Industrial action, comprising the strike, boycott, and other methods, has been relied upon chiefly to enforce the wage-earners' demands. indicates clearly that there has been usually no hesitancy in indicates clearly that there has been usually no hesitancy in recourse to such methods, nor in the employers' utilization of measures similarly warlike.

It is necessary to add that, within recent years, a solution quite different from the customary conflict between these two contending parties seems to have occurred in certain instances. There is considerable reason to suspect the existence of something closely resembling conspiracy between the two organized parties to the wage problem in certain specific cases, with an unorganized public as its victim. Public and quasi-public utilities are the field at which the finger of suspicion points. Apparently the scheme is somewhat as follows. The workers' organization demands an increase in wages. Organized capital, after some pretense of reluctance, grants the increase. This is followed as soon as possible by a rise in prices of the services or commodities involved, on the ground that the increase in wages necessitates it. Care being taken that the increase accruing from the higher price or rate is in excess of the increase in the wage bill, both parties profit by the transaction. The propaganda which usually accompanies such manipulations is directed to divert attention away from this aspect. Meanwhile the public grumbles, then forgets, and pays. It is difficult, of course, to get at all of the facts necessary to substantiate such charges, but it is well that their possibility be recognized.

Throughout the life of organized labor in the United States, the possibilities of political action have never been lost sight

[1] HOLLANDER, *op. cit.*, pp. 53-54.

of, despite the disastrous experience in earlier attempts in this direction. In general, the political policy of the American labor movement has consisted in voting for members of the two prevailing parties, as these members have befriended the cause of the workers. It has been a policy of rewarding labor's friends and punishing its enemies. Effective legislative lobbies also are maintained to watch over the interests of labor in state legislatures and the federal Congress.

Within recent years, however, there has developed a definite movement for direct political action. In November, 1918, the Independent Labor Party of Illinois was organized at a meeting of the Chicago Federation of Labor. This movement was indorsed by the State Federation and the following spring, a state convention was held, at which a platform was drawn up. The same year (1919) the Central unions of Greater New York and the State Federation of Pennsylvania organized labor parties, and within a short time not less than forty labor parties were organized in various parts of the country. In November, 1919, more than a thousand delegates representing labor and farmers' organizations assembled in Chicago and organized the Labor Party of the United States, but the American Federation of Labor, mindful of the experience of the Knights of Labor and other earlier organizations with political experiments, maintained at the time its traditional policy of disapproving all attempts to project labor parties into the political arena. Developments since then indicate that the workers approve of political action in conjunction with the liberal forces in the various states. In the summer of 1924, both the railway brotherhoods and the American Federation of Labor indorsed the candidacy for President of the United States of Senator Robert LaFollette, and for the first time in its history the latter organization participated actively in a political organization on a grand scale. The success of the British Labor Party has doubtless had an important influence on the movement in this country.[1]

Among the political demands of organized labor are the

[1] Watkins, Gordon S., *An Introduction to the Study of Labor Problems*, Thomas Y. Crowell Company, New York, 1922, pp. 379, 380.

public ownership of all public utilities and basic industries; the abolition of the United States Senate and state senates; the election of the President and Vice-President of the United States by direct vote of the people without the intervention of an electoral college; restriction of the power of judges to nullify laws and to set them aside as unconstitutional; the provision of an easier method of amending the federal Constitution; a minimum wage for workers fixed by law; old-age pensions; unemployment and sickness insurance; national initiative, referendum, and recall; international disarmament; abolition of employment for all children under sixteen years of age; the right of labor to organize and bargain collectively; and freedom of speech, press, and assemblage.

The Farmers' Coöperative Movement.—The farmer, like the industrial laborer, must depend very largely upon collective bargaining to maintain or improve his position in a competitive economic system. His problems, however, are somewhat more complex than those of the urban worker, since he is also a capitalist on a small scale, confronted with questions of production, marketing, purchasing, and consumption. As an individual farmer, operating on a small scale in these matters, he can scarcely be expected to compete with much success for the value of his product. His only hope of evading predatory middlemen and speculators is through combinations with other farmers which will increase his bargaining power.

Unfortunately, the great dispersion of the productive units, the disparity of products, the variation in size of farms, and the tenaciously individualistic attitudes of independent farmers, make combinations such as partnerships, unions, or stock companies impracticable. To meet this situation, farm leaders have devised rather loosely organized "coöperative associations" which are designed to secure the benefits of combination with the least possible restraint upon the actions of participating members.

The farmer is much more interested in distributive coöperation than in consumers' coöperation. No aspect of the agricultural problem in the United States has received more attention in recent years than that of coöperative farm marketing;

none, by common consent of all thoughtful students, offers more immediate promise. "Perhaps the most interesting development at the present time in this field is the so-called commodity coöperative. A commodity coöperative might be defined as a coöperative marketing arrangement which deals with only one commodity and includes most of the producers in its entire production area. The first important commodity coöperative in the field was probably the Citrus Fruit Growers of California. However, recently there has been a great development of similar associations. The prune, raisin, and walnut growers of the same state are now organized. The cotton growers and tobacco growers of the South are following. A study of these really huge marketing coöperations reveals that they have a single purpose—that is, to market their commodity in such a way as to obtain the maximum return. Their general scheme of organization is somewhat as follows: Many producers of some commodity, such as cotton, eggs, or fruit, in a given region are organized into a marketing corporation. Each member contracts to market all the product he raises through this corporation. Warehouses are built. Experts in grading and marketing are employed and the farmer has only to deliver his crop to his local warehouse or grading establishment and receive a warehouse receipt for it. He also agrees to endeavor to produce a product of a definite type. For example, when the egg raisers of California decided to attempt the capture of the white-egg market of New York, each farmer agreed to keep only white Leghorn hens. By this method, a more or less standard type of product was obtained. This did not, however, eliminate the necessity for careful grading." [1]

The Present Status of Farmers' Coöperative Business Organizations.—The history of farmers' coöperative efforts in the United States shows a number of interesting failures. "The Grange," "The Alliance," "The Wheel," "The Farmers' Union," and others have risen and fallen on successive waves of sentiment or necessity. Gradually, however, solidification of interests, a growing group consciousness, and experience in the conduct of such enterprises have paved the way for

[1] Tugwell, Munro, and Stryker, *op. cit.*, p. 181.

possible permanent success. At any rate, the movement, speaking in general terms, is in a flourishing condition at the present time, with a marked growth during the last decade. The Division of Coöperative Marketing, in the Bureau of Agricultural Economics of the United States Department of Agriculture, which is a research and service agency for the cooperative marketing of farm products, reports that in 1925 it received reports from 10,803 such associations, having an estimated membership of 2,700,000 farmers, and an estimated volume of business of $2,400,000,000. A study of these organizations,[1] made in 1924, showed that 70.9 per cent of these associations, doing 44.3 per cent of their total business, were in the North Central States.

It is interesting to note a change which has been taking place in the character of the agricultural coöperative movement since about 1920. "Prior to that year farmers' business organizations were mostly local enterprises with occasional federations of locals for selling purposes. Both the total membership and the total amount of business were made up of a large number of relatively small items. Since 1920 the 'large' organization operating over an entire producing section or even an entire State has developed. The importance of this change in the development of agricultural coöperation in the United States will be appreciated when it is noted that 50 of these new 'large' organizations have a membership that is larger than the total estimated membership of the 5,424 associations included in the 1915 study, and the amount of business handled annually by these 'large' associations is greater than the total estimated amount of business for all the associations in 1915." [2]

POSSIBILITIES THROUGH INCREASED PRODUCTION

Reference has been made in a preceding chapter to the fact that the question of individual income must not be con-

[1] Cf. Elsworth, R. H., "The Development and Present Status of Farmers' Coöperative Business Organizations," U. S. Department of Agriculture, Bulletin No. 1302, Government Printing Office, Washington, 1925.

[2] *Ibid.*, pp. 3-4.

sidered apart from that of national productivity. However much one may deplore the process of economic allotment in giving not enough to many, and by inference too much to some, any attempt to solve the problem of low individual incomes by changes in distribution alone must be pronounced unsatisfactory.

The relative importance of increased production, as over against that of a more equitable distribution, raises a question upon which there is considerable disagreement. On the one hand it is alleged that real wages can and do increase only as production increases, that as the national income grows the proportion paid in the form of wages becomes larger—in other words, that increased productivity is the answer to the problem of low incomes. Objection to this contention is made on various grounds—that while increasing productivity enlarges the possibilities of higher incomes, whether these possibilities are realized depends either on the blind play of economic forces or on a higher degree of social control than has been exercised in the past; that an increase in the national income may be absorbed by rising standards of living, leaving constant or increasing the extent of inequality; that the very forces which increase the national product and enlarge the social surplus, if left to themselves, breed conditions of want; that society may grow richer, civilization may advance, and yet poverty continue to grow, cancer-like, at its vitals. Discussion of the importance relatively of two factors both of which are essential is always fruitless. A sound program of social progress must include plans both for increasing production and for a more equitable distribution.

How Can Production Be Increased?—Productivity depends upon a number of basic factors such as natural resources, quality of the people, their social organization, the instruments of production, and the technique of production. It is apparent that the problem of increasing the national income involves the entire fabric of our civilization.

The United States is favored to an unusual degree in regard to the first four of the factors named, and since any improvement in them is a matter of slow and gradual development, it

follows that the most practicable means of immediate increase in production is a matter of improving the technique of production. This in turn involves progress of two kinds—one in the development of the arts and sciences, the other in the application and effective utilization of the knowledge we already possess. Since the latter is the more realizable task, it is this aspect of the problem of increasing productivity which is emphasized.

Waste in Industry.—In January, 1921, Mr. Herbert Hoover, as president of the Federated American Engineering Societies, named seventeen engineers to make a study of waste in industry. This committee consisted of men with broad experience, and the engineers who conducted the field investigations were selected with great care from engineering firms with a long and favorable record in the particular type of industry which its representatives were asked to study. In the committee's investigations, waste was conceived of as "that part of the material, time, and human effort represented by the difference between average attainments on the one hand and the practical attainable performances on the other, as revealed by the detailed reports." [1] In other words, no theoretical standard of performance or excellence was established, but a comparison made between average practice and the best-known practice.

The committee concluded that the industrial waste in the United States is enormous, and that much of it can be eliminated. In every industry studied, plants were found wherein much of the waste occurring in other plants had been eliminated. "The evaluation of responsibility for remedying the condition as derived by the committee places more than 50 per cent upon management and less than 25 per cent upon labor. That is to say, if industrial waste is to be eliminated, management can through its opportunity remove more than 50 per cent of it, whereas labor can through its opportunity remove less than 25 per cent." [2]

[1] WALLACE, L. W., "Industrial Waste," *The Annals of the American Academy of Political and Social Science*, Philadelphia, September, 1921, p. 37.
[2] *Ibid.*, p. 42.

The Scientific-management Movement.—It is evident that there is a fruitful possibility of increasing production in the application of well-known scientific methods to industrial organization and management. The term Scientific Management is applied usually to this process.

The Scientific-management movement is of comparatively recent development. The foundations for it were laid during the years 1880-90 by Frederick Taylor, who is recognized as the father of Scientific Management not only in the United States, but throughout the world. Its growth for a number of years was slow; modern industry had to be educated to its necessity and its possibilities; the field was exploited for a time by "efficiency" fakers, who promised short cuts to profits which failed to materialize; and unfortunately much of the earlier literature concerned the metal trades, which led men in other lines of industrial pursuits to decide that it had no meaning for them. At the time that the United States entered the World War, the movement may be said to have been in a condition of deflated interest but gradual growth. The war, however, demanded the organization of the nation's industries and their coördination for a common purpose; industrial leaders, like a great many other individuals, were forced out of time-worn ruts, and the idealism generated by the national crisis created a new concept of the relationship of industry to society and of management to men. Factors such as these wrought a change in operating methods in American industry and gave Scientific Management both stimulus and opportunity.[1]

Scientific Management aims to do the mental labor of production in a separate planning department in a manner analogous to that in which the engineering department conducts the scientific part of machine design; in other words, to correlate the details of operation of an enterprise so that it will work as a harmonious whole toward the desired goal. Taylor has laid down the duties of management as follows: [2]

[1] Lansburgh, R. H., *Industrial Management*, John Wiley & Sons, New York, 1923, Chap. 3.

[2] Taylor, F. W., *Principles of Scientific Management*, Harper & Bros., New York (1919 edition), p. 36.

First: The development of a science for each element of a man's work, thereby replacing the old rule-of-thumb method.

Second: The selection of the best workers for each particular task and then training, teaching, and developing the workman, in place of the former practice of allowing the worker to select his own task and train himself as best he could.

Third: The development of hearty coöperation between the management and the men in the carrying on of the activities in accordance with the principles of the developed science.

Fourth: The division of the work in almost equal shares between the management and the workers, each department taking over the work for which it is best fitted, instead of the former conditions in which most of the work and the greater part of the responsibility were thrown upon the men.

Scientific Management, broadly conceived, can do much to increase production, and a number of factors are combining to insure steady progress in its development. "Among these are the growth of societies whose membership consists largely of plant executives and whose interests lie entirely with management problems, the increasing literature, both periodical and book, on management subjects, and the attention being devoted by the next generation of factory managers, now in educational institutions, to management as a study." [1]

Waste in Agriculture.—Modern thinking has been so preoccupied with the problems of industry and the city that relatively little attention has been paid to the rural factors in our civilization. When it is remembered, however, that almost half of our entire population is classified as rural, that more than one-fourth of all persons gainfully employed are engaged in agriculture (the census on occupations was made in midwinter), that the value of farm property is one and a half times the total capital invested in manufacturing industries, mines, and quarries, it must be evident that this one-sided emphasis is neither logical nor far-sighted.

As in industry, so in agriculture, there is enormous waste.

[1] LANSBURGH, *op. cit.*, pp. 35-36.

No one has ever attempted to conduct a farm or even a small garden without becoming aware of the many pests with which it is necessary to contend. The United States Department of Agriculture has estimated the annual loss to farmers from pests in recent years at a billion dollars a year. This is equal to about 7 per cent of the total value of crops in 1919, and equivalent to a loss to about ten dollars per capita of the population.

The chief causes of this staggering loss are insects, such as the boll-weevil, the Hessian fly, the coddling moth, and the corn-borer; plant diseases, including smut, wheat rust, and pear blight; the depredations of animals, like rats, prairie dogs, rabbits, mice, and grasshoppers; and diseases of animals, such as bovine tuberculosis, hog cholera, sheep scabies, and Texas fever.

There are references from the earliest times to scourges which ran their devastating courses through lands and flocks, and the day is not long past when they were looked upon almost universally as afflictions sent by Providence, to be endured with Christian resignation, or at best to be mitigated by appeals to the Deity. The present-day conception is that they are controllable and preventable—a challenge to concerted action.

The United States Department of Agriculture has taken the lead in the movement against these pests, and its work has been seconded ably by some of the states' departments. Direct attack as well as control through quarantine are prosecuted as vigorously as public opinion permits, with results that are most satisfactory. There is needed, however, a campaign of education both as to the possibility of prevention and the concrete methods to be employed.

Better Farm Management.—Comparable to scientific management in industry is the movement in rural life aiming at better farm management. While the nature of agriculture makes it somewhat difficult to apply outright those processes of efficiency which have characterized the development of our industrial enterprises, there is much, nevertheless, that can be done in this respect in the rural field. Speaking in general

terms, what appears to be necessary essentially is this: that the farmer take account of the factors which enter into his productive enterprises, to consider in what ways, and to what extent, these can be combined and controlled so as to secure lower production costs or a greater net output.

There are many specific problems which need consideration. Among them are such as these: the standardization of farms on the basis of the most economical type and size of unit; the amount of capital and equipment of stock and machinery needed to operate such a farm to the best advantage; which crops are best fitted for different types of soil; which rotation systems will give the largest returns; what crops should be selected on the basis of distance to the market; and the development of cost-accounting systems, simple yet practical, which will enable the farmer to determine definitely his sources of loss and profit.

These problems of farm management are becoming increasingly important. Heretofore a somewhat general and rather appreciable source of income for farmers has been the increasing value of land. Obviously, this cannot be a permanent condition. Ultimately, land values will be relatively stabilized. As, and to the extent that, this happens, there results a fundamental change in the financial position of the farmer. He ceases to be a speculator and becomes essentially a producer, or manufacturer. As inefficient management ceases to be sustained by unearned increment, better farm management will be correspondingly at a premium.

POSSIBILITIES THROUGH DECREASING EXPENDITURES

If the great mass of people are interested primarily in increasing incomes, it cannot be said that they have neglected the possible alternative of decreasing expenditures. At first glance, the general application of this statement may be doubted. Have not standards of living been rising? How can rising standards and decreasing expenditures be reconciled?

The Small Family System.—One of the most striking features of the recent biological and social history of man is the decline in the birth rate and the consequent decrease in the

size of families. This tendency began to manifest itself after the middle of the nineteenth century, and by the opening decade of the twentieth century, in those countries of Western civilization which have the vital statistics necessary to make the comparison, the decline varied between 10 and 30 per cent.

The United States has no birth rate statistics of any real value, despite some progress in this direction in recent years in a few of the states, but the two available substitutes which are used generally show unmistakably a similar trend. One of these substitutes is to take the number of children under five years of age per thousand women of child-bearing age—the age groups from fifteen to forty-nine being included usually. Such a comparison by census decades shows the following:

1860	634
1870	572
1880	559
1890	485
1900	479
1910	445
1920	422

The other substitute for a birth rate is a comparison of the average size of the family as given in successive census years. This shows the following change:

1860	5.3
1870	5.1
1880	5.
1890	4.9
1900	4.7
1910	4.5
1920	4.3

Of all the factors influencing the birth rate—and many have been emphasized by way of explanation—the most potent is the voluntary restriction of births. All the facts point to the conclusion that there is a volitional limitation of the number of children in order to control consciously the circumstances and conditions of family life as affected by the number of its members. Apparently there is no great increase in the number of childless marriages, but rather an extension of what has been called "the small family system." "The cus-

tom of standardizing the family, so common in France, is rapidly spreading to other lands, especially among the members of the higher social strata. Large families are no longer in style, and parents who have many children are often regarded as guilty of a violation of good form, if they do not incur a more serious judgment." [1] While people limit fecundity for reasons connected with the family income, it should be noted that restriction is by no means inversely proportional to the size of the bank account. Being volitional, the movement is selective, even if general.

Religion as a Factor in Curtailing Family Expenditure.—In the history of almost all religions, self-inflicted privation and suffering have been considered as distinguishing marks of superior piety. In the earlier stages, their purpose is to appease the assumed wrath of gods and demons, but subsequently emphasis is laid upon their value in the training of the spiritual life. The word asceticism, which is used generally to indicate such practices, is derived from the Greek word for training. Thus the ascetic may be thought of as a spiritual athlete.

Asceticism has taken various forms: self-mutilation; circumcision; tattooing; fasting; penance; the legalism which forbids dancing, theater-going, wine-drinking, card-playing; and various other abstinences from the pleasures of life. One aspect of the ascetic philosophy, which is of particular importance to our discussion, is the emphasis given to the gospel of contentment with one's lot. To bear one's burdens with pious resignation is a duty which religious leaders have enjoined constantly, with the promise of generous compensation in the life to come. It is the indifference to the material rewards of this world, and the corresponding enthusiasm about those of a future existence, which account at least in part for the impatience of organized labor with the church.

It is interesting to note in passing that preachments of contentment with conditions at home are paralleled by the activities of missionaries which create discontent with stand-

[1] Holmes, Samuel J., *The Trend of the Race,* Harcourt, Brace & Company, New York, 1921, p. 168.

ards in foreign lands. The missionary's insistence to the untutored savage that the conservation of morals necessitates additional attire results in changes in his standard of living, with far-reaching economic consequences. It is not meant to say that these contrasting economic results are affected consciously. Reference is made solely to results, not to deliberate intent. There is, however, some reason to suspect that in recent years a kind of religious activity, typified by the professional revivalist, has received substantial encouragement from certain well-defined economic interests, with a view of the possible restraining effect upon the demands of the workers.

What importance is to be assigned to religion as a factor in the curtailment of family expenditure it is difficult to say. Undoubtedly there are many people who practice self-denial from religious motives, in addition to such others as rationalize their lack of sufficient income in terms of superior enthusiasm and religious duty.

Buying Coöperatively.—Another possibility by way of decreasing expenditures without a corresponding lowering of standards is to increase the purchasing power of income through more advantageous buying. To accomplish this, consumers have patronized a variety of coöperative organizations. "A small group of farmers or city laborers have loosely banded together for the purpose of buying a car load or more of provisions. Temporarily, a local grange or farmers' union has been converted into a buying institution to satisfy the needs of its members for consumptive goods. In addition to marketing live stock, a few coöperative live-stock shipping associations have been used as a means of supplying members with staples. Some coöperative vegetable concerns have been employed: first, to market vegetables, second, to purchase articles for consumers. Besides manufacturing butter, a few coöperative creameries have supplied patrons with provisions. Fruit associations, in some cases, have bought goods for their members. Farmers' elevators have, at times, looked at once after marketing and storing and purchasing goods. Finally,

stores have been acquired by consumers for the sole purpose of buying and distributing articles coöperatively." [1]

The Historical Development of Consumers' Coöperation.—The modern coöperative movement virtually dates from 1843. In that year, in Rochdale, a manufacturing town of northern England, a group of twenty-eight flannel weavers, who had just gone through an unsuccessful strike, met to discuss what they should do. They decided to start a coöperative store which would free the workmen from the high prices charged by company stores. The members painfully saved twopence a week until each had accumulated a pound, and with this scanty capital they started a store. More than eighty years have elapsed since then, and from this insignificant venture has sprung a mighty movement with almost five million members in Great Britain, belonging to some 2,400 societies, and with sales amounting in 1920 to a billion and a quarter of dollars. Other European countries are also dotted with going concerns that are coöperative. France has 3,724 stores with a membership of 1,313,997; Switzerland has 461 stores with 341,826 members; and Denmark has 1,562 stores with 243,855 members. Germany is the home of coöperative credit societies. The movement grew very rapidly in the years before the war, and Breslau has the largest society in the world with 100,000 members. The total membership of German consumers' coöperative societies in 1918 was about four million, and while the average sales per member is relatively small in Germany, this is due not to the disloyalty of the members, but because these societies confine their trade to groceries.[2]

Development and Status in the United States.—Many cooperative store waves have swept over the United States. The first movement developed in Boston in 1844, and out of a buying club organized there at that time there resulted the New England Protective Union, which, at its height, comprised over 400 divisions, with a membership of more than 5,000, a working capital of $225,000, and sales that amounted

[1] Comish, Newell H., *The Standard of Living*, The Macmillan Company, New York, 1923, p. 229.

[2] Douglas, Hitchcock and Atkins, *op. cit.*, pp. 681-691.

annually to considerably more than $500,000. Because of internal quarrels, this society split up, and out of it leaped the American Protective Union, which by 1857 operated some 700 stores, most of them through the New England states. This movement receded shortly before the Civil War.

The next movement followed on the heels of the Civil War. It was initiated by the Patrons of Husbandry. Numerous stores sprang up, extending all over the country. While a few still survive, most of them failed during the rapid decline of the Grange in the 'seventies. Meanwhile, a third movement was inspired by the Sovereigns of Industry, who held sway from about 1874 to 1880. During these years, coöperative stores dotted the Atlantic coast from Maine to Maryland, but few of them survived the close of the decade. Then during the 'eighties, the Knights of Labor launched afresh a campaign for coöperative buying, marked again by a rapid growth but early failure. From then on to the end of the century, the coöperative store movement was dead in the United States.[1]

With the beginning of the present century, the idea returned to life and coöperative stores again flourished all over the country. The United States Bureau of Labor Statistics conducted an investigation of consumers' coöperation in 1920 and found some 2,600 societies to be in existence. Only 1,009, however, furnished data. Eight hundred and seven, or 80 per cent of the total, were conducted according to Rochdale principles. The total membership of those reporting was 260,000. Allowing an equal average membership for those not reporting, the total number of coöperative members would have been nearly 700,000.

It might be noted that the societies were located almost entirely in the country and in the smaller towns and cities. Few have found a foothold in the large centers of population. Most of them had not been running long. Eighty per cent of those reporting had earned a profit during the preceding year. The movement is especially strong among the Finns and the

[1] Comish, *op. cit.*, pp. 236-239.

coal miners of Illinois and Pennsylvania.[1] The war gave it a considerable impetus, the American Federation of Labor supports it, and the Coöperative League of America is waging an aggressive propagandist campaign for it.

The Outlook for the Coöperative Movement.—Coöperative organizations have succeeded in Europe about as generally as they have failed in the United States. This would suggest that the causes of failure are peculiar to this country. Whatever other contributing factors there may be, the fundamental explanation for the lack of success in the United States is to be found probably in the American wage-earner's primary interest in increased income rather than economy of expenditure, reference to which is made at the beginning of this chapter. Likewise, the European worker's interest in the latter would explain the success of the movement abroad.

One can only guess at the future development of consumers' coöperation in the United States. The most that can be said is that as conditions here compel a change in the philosophy of the wage-earners in this respect, consumers' organizations may flourish within such limits as foreign experience seems to indicate as inevitable.

More Rational Consumption.—Two families of the same size, with identical aspirations and incomes, may differ decidedly with reference to the standard of living actually attained. One reason for this may be the difference in the quantity of goods which these families are able to purchase with the specific amount of income; another, and more likely, explanation is the difference in the selection of goods purchased and in the intelligence exercised in their utilization.

It is only repeating a truism to say that the ignorance of consumers with its resultant wastage is common in all classes and enormous in its extent. The majority of consumers rarely stop to consider whether the food they eat, the clothes they wear, or the furnishings of their homes give the best results in health, efficiency, and comfort. The yoke of convention and the paw of the advertising lion, rather than

[1] Bulletin 313, "Consumers' Coöperative Societies in the United States in 1920," *U. S. Bureau of Labor Statistics.*

an intelligent analysis of values, determine the average person's selection of commodities. It is only within the past few years, with sharply rising costs of living, that attention is being given to the question of the most economical expenditure of income.

Domestic science, for example, is emphasizing increasingly how very uneconomical our food habits are. When it is remembered that from 40 to 50 per cent of the expenditures of wage-earning families is for food, the tremendous significance of this fact is apparent.

"Qualitative standards to measure the efficiency of the family food budget have been worked out tentatively in dietary studies. We do not eat or wear or burn dollars and cents. If the price of beef goes up we can eat less beef and more of some other protein-rich food, and perhaps keep our money expenses for food constant, but if the price of all foods increases 100 per cent we cannot cut down our consumption one-half so as to keep our food-budget expense undamaged. To speak with scientific accuracy, man does not live by loaves of bread, pounds of meat, pecks of potatoes, quarts of milk, etc. He lives by the energy stored in food, which energy is measured in heat units called calories. There must be a proper balance between proteins, fats, starches, cellulose, fruit acids, and mineral salts. The last three classes of food furnish us no calories at all, but they are just as essential to a healthy diet as the fats, sugars, and starches which furnish a large quantity of calories. By far the best measure of the sufficiency of a diet is, however, the calories. Unless the average active worker consumes and assimilates from 3,000 to 3,500 calories per day he will inevitably lose either weight or efficiency as a worker, or both, and this regardless of the number of dollars he spends for food, or even of the number of pounds of bread, beans, and beef he eats. Unfortunately, bread, beef, pork, and even eggs and potatoes vary considerably in the calorie content per pound.

"By the time people became educated to the point where they recognize that the important thing in regard to food is not its price per pound or quart, that often the cheapest food

per pound is the most expensive per unit of nourishment, they will no doubt have learned also that man cannot live by bread alone or even by calories alone. Fruits and vegetables must be used largely in a proper diet, even though the calorie content is low. A proper balance between proteins, fats, starches, cellulose tissue, minerals, and acids is necessary for the maintenance of health." [1]

"In this matter of the consumer's responsibility an enormous influence can be exercised with women. In the constituency of consumers they have already got a vote and a majority, and can use it today with overwhelming effect. Most of the world's spending is done by them, especially in the middle class, whose members and wealth makes its action all-important. In many middle-class households the man, the ostensible head of the family, is more or less in the position of the doctor described by Mr. Arnold Bennett in *Buried Alive,* whose 'wife and two fully developed daughters spent too much on their frocks. For years, losing sight of the fact that he was an immortal soul, they had been treating him as a breakfast-in-the-slot machine: they put a breakfast in the slot, pushed a button of his waistcoat, and drew out bank notes.' Household expenditure, that bulks so large in most of our budgets, is regulated almost entirely by the women of the family, who are the spending departments of the domestic civil service. If women could be brought to see, and act on, their responsibility as consumers, we should have made a long step forward toward a big reform." [2]

It is an outstanding indictment of our educational system that it has failed so generally to train the next generation to habits of wise and economical consumption. With the equalization of educational opportunities for the sexes, and with the majority of girls destined ultimately to become homemakers, the belated and incidental gestures in this direction made thus far in our system of public instruction are pitifully inadequate.

[1] MEEKER, ROYAL, in the *Monthly Labor Review,* Vol. IX, No. 1, pp. 3-4.

[2] WITHERS, HARTLEY, "The Consumer's Responsibility," *Annals of the American Academy of Political and Social Science,* Vol. LXXXVII, No. 176, January, 1920.

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Part Two

SOCIAL WELL-BEING AND PROBLEMS OF PHYSICAL WELFARE

CHAPTER VII

SOCIAL IMPORTANCE OF PHYSICAL WELFARE

For many centuries human beings were regarded as if they were minds without bodies. Writings dealing with the history of man in its various aspects contain almost no reference to health or disease except occasionally in very detailed biographies or when an epidemic carried off thousands of people. Health seems either to be assumed or to be ignored. The early Hebrew and classical civilizations stand out for a time as exceptions to these statements, but later Greek development, for instance, was decidedly retrograde in this respect. Platonism introduced the idea of the opposition of mind and matter—mind being conceived as the formative principle, matter as the chaotic and unformed. This doctrine placed matter in a position of inferiority, since it hindered the development of mind. To this idea was added the Hebrew conception of sin, and both were intensified by the early Christian influence, with the cult of the "unwashed saints" of the Middle Ages as the extreme exponents of this composite philosophy. It was this philosophy, that the body was the seat of sin and hence an obstacle to the free development of the spirit, which led the Puritan to consider reference to his physical condition as sinful or at least indelicate, historians to ignore the subject or to treat it with contempt, and religious enthusiasts like St. Paul to yearn to be delivered from "this body of death."[1]

NEW APPRECIATION OF THE IMPORTANCE OF HEALTH

Within comparatively recent years, there has developed an entirely new conception of health and its fundamental importance, both as an asset to the individual and as a factor in social welfare. So generally shared has been this newer

[1] Binder, Rudolph, *Health and Social Progress,* Prentice-Hall, Inc., New York, 1920, pp. 5-9.

attitude, and so far-reaching have been its consequences, that it constitutes virtually a new epoch in the history of social philosophy. From it already have appeared legislation for more healthful housing; workmen's compensation acts; a nation-wide movement for safety first; the intelligent and scientific study of occupational disease hazards; physical examination and health supervision of workers; the installation of sanitary conveniences and safeguards in factories; the development of medical inspection and a program of health education in the schools; the crystallization of a movement for social health insurance; the reconstruction of charitable work; the acceleration of medical and social research into the causes of ill-health; and a more or less concerted effort on the part of many public and private agencies for the promotion of positive health. Other illustrations of the modern preoccupation with health may be seen in the extent to which propagandas of all kinds masquerade in health dress, and in the avidity with which advertisers appeal to the health interest in behalf of all sorts of commodities from O'Sullivan's Heels to the newest concoction for the relief of dandruff.

BASES FOR THE PREDOMINANCE OF THE HEALTH INTEREST

The present-day emphasis upon health is the result of an insight gained through experience in various fields of human activity.

1. *Its Military Importance.*—"In all the wars of history (with the doubtful exception of the Russo-Japanese conflict) much more disability and many more deaths have resulted from disease than from wounds. Campaigns which should have succeeded have frequently failed because of the utter breakdown of armies from preventable diseases, such as cholera, plague, typhoid, typhus, smallpox, malaria, dysentery, and yellow fever. The invasion of Canada by Montgomery and Arnold in 1775 was unsuccessful because of the enormous percentage of losses from smallpox and dysentery. Napoleon's plan to found a colonial empire in what is now the southern United States failed because 15,000 men of his fine army, sent out for that purpose in 1802, perished in Santo Domingo of

yellow fever and other tropical diseases. The British in the Crimea lost twenty-five times more men from disease than from wounds. Brief as was the war with Spain, deaths from sickness in our army were over seven times more numerous than were those from injury. Even in the Balkan War, recently terminated, the Bulgarian campaign (carried on at first with such fiery vigor and astonishing success) broke down largely because of epidemic disease. The occurrence in one day of about 30,000 cases of a choleraic dysentery was a more vital factor than was the Turkish resistance in the check of the Bulgarian army at Chatalja and its failure to capture Constantinople."[1]

During the World War there was a good deal of comment concerning the inactivity of the Allied army in Macedonia, consisting of approximately 750,000 men. Measured by what happened on other fronts, this army did practically nothing. Surmises of every possible nature were advanced, and to persons not familiar with the ravages of malaria it seems incredible that fully one-half of the Allied strength there was out of action for that reason. There were times when more men were invalided home per week than arrived on ships, when battalions had three-fourths of their men on their backs, and when companies had as few as five men fit for duty.[2]

"Health has been the greatest factor in the history of man," says Professor Binder, "since it is the strong and healthy nations which have in the end conquered their richer and perhaps more civilized neighbors. . . . History is hardly more than an endless repetition of victories by people coming from the north or the mountains—localities less infested with disease germs—over people living in rich and fertile plains, where these germs found more favorable conditions for breeding."[3]

Military leaders have learned the lesson of history, and, by a curious irony of fate, armies which once spread disease throughout the civilian population are now an example and an

[1] Lieutenant-Colonel Keefer in "Military Hygiene and Sanitation," cited by Winslow, C. E. A., *National Conference of Social Work, Annual Report*, 1917, Chicago, p. 169. Colonel Keefer wrote this before the World War.

[2] Binder, *op. cit.*, pp. ix, x.

[3] *Ibid.*, p. 3.

inspiration for our lagging public health authorities in times of peace, for disease is today far more effectively controlled in the camp than in the market place.

2. *Experience of the Schools.*—Nowhere today is the vital importance of health recognized more clearly than in educational circles, primarily because it has been found that physical well-being is indispensable to school progress.

In the last quarter of a century the drag-net of compulsory education has brought into the schools an indiscriminate mass of students—the rich and the poor, the bright and the dull, the healthy and the sick. During the same time there have come changes in the length of the school term, an increase in the number of years of schooling required, and a considerable advance in the standards of work required. As a result educators have found that a large number of pupils are unable to keep up with their classes, and the terms "backward" and "retarded" as applied to school children have become current coin in the realm of pedagogy. Because these laggards interfered with the ordinary administration of our school systems, the question was raised increasingly why they were backward and retarded.

Meanwhile, it had been found necessary to employ physicians in the schools to detect and control communicable diseases, primarily for the protection of the community. Somewhat incidentally in the pursuit of this work, physicians began to see, and as a result of their discoveries educators began to realize, that a very large proportion of children in the schools were handicapped by physical defects of various kinds. Because the correction of these defects led so frequently to improvement of school work, the relationship between the two began to be recognized. This led in time to an extension of the scope of medical inspection to include the physical examination of school children with the aim of discovering whether or not they were suffering from such defects as would handicap their educational progress and prevent them from receiving the full benefit of the free education furnished by the state. Twenty years ago this work was

in its infancy; today it is an integral part of the public school system not only in the United States but throughout the civilized world.

Medical inspection rests upon the recognition of the close connection which exists between the physical and mental condition of the child and the whole process of education. That this connection exists has been amply proven by recent researches in the fields of medicine and psychology, showing that mind is not a separate entity functioning independently in the body, but rather as one element in the whole life process.

Whatever skepticism may have existed about the importance to the school *per se* of physical defects in pupils has been overcome by the results of medical and health work. "Ayres, Cornell and others have given good reason to believe from their investigations that a large share of retardation is due to physical defects and the absence and illness caused by them. I have shown that perhaps 25 per cent or more of absences from school is caused by illness and that absence is a very large factor in causing retardation. Absence has a proved correlation with non-promotion, and illness is the chief cause of absence, especially the longer absences. Experiments carried on by Wallin in Cleveland and by Kohnky in Cincinnati seem to indicate that mere dental hygiene has probably a decidedly favorable effect on the mental and physical status of school children. In the Cincinnati investigations a control class was used and the results seem to show a direct causal relationship between mouth hygiene and school progress. Doctors and nurses and teachers of the public schools where medical supervision is carried on are unanimous in their opinion, based on observation, that school progress for very many children is materially hastened by the elimination of their physical defects and the cure of their ailments." [1]

3. *Its Economic Value.*—That the efficiency of labor is dependent in large measure upon the health of the workers

[1] RAPEER, LOUIS W., *Educational Hygiene,* Charles Scribner's Sons, New York, 1915, pp. 17-20.

has long been recognized in principle, but until recently ignored in practice in the United States. For three hundred years, labor has been imported into this country in a systematic manner and on a large scale. Entire regions, scattered over three continents, have been denuded of their surplus populations in the course of this process. As long as healthy youth could thus be obtained, exploited to the limit, and then in a measure at least be returned to the country of its source, a policy of callous indifference prevailed.

But events in recent years are changing this situation. With the continued development of American industries, there has been no abatement in the demand for man power, yet immigration laws are checking the foreign sources of the supply. Just as the diminishing supply of natural resources results in a change from extensive to intensive cultivation, so there occurs a similar change in the policy toward labor. Considerations of its conservation and more effective utilization become inevitable. Thus it happens that economists and employers begin to take thought unto themselves, begin to emphasize the loss in productivity entailed by lack of health, gradually even sense the difference between a worker negatively well and one in perfect health. Economic interest, rationalized into humanitarian terms, insists that the sacrifice of the worker to insanitary conditions is unjustifiable; economic necessity prods a lagging intelligence to conclude that, while the wealth of the state rests upon its industries, its industries in reality are based on the health of the worker, that labor capitalized is worth four to five times as much as all other capital.

Health may affect the economic life of a people not only through its direct bearing upon productivity, but in other ways. Ellsworth Huntington has advanced recently a unique theory, interesting in this connection. Business cycles, he contends, depend largely on the mental attitude of the community, and the mental attitude depends upon health. "Contrary as it seems to our established convictions, there appears to be no way of avoiding the conclusion that economic cycles

of adversity and prosperity in the United States depend upon health far more than upon any other factor." [1]

HEALTH AND CIVILIZATION

It has been a common practice in times past to interpret the history of civilization and the rise and fall of particular nations in terms of some single factor. Providential intervention, great men, morality, accident, geography, race, economic development, actinic rays—all these have had their day, and many interesting attempts have been made to coordinate the facts of history in support of the all-pervading importance of one or another of these factors.

Today, the development of civilization is being reinterpreted in terms of health and disease. The decadence of Greece and Rome, for instance, is attributed not primarily to moral decay, but to malaria. Social progress is traced to a surplus of physical well-being. Professor Binder's *Health and Social Progress* is an interesting illustration of such an interpretation, and the following passages quoted from that book will indicate the trend of thought.

"Whatever aspect of society we may consider, whether it be the arts of peaceful civilization, or the clashing arms of war, or the depressing problems of social inefficiency, or the future of the nation, we are always led back to health as a fundamental factor in social progress." [2]

"Why have the tropical and sub-tropical countries never attained to a permanent civilization? In almost every part of the world have civilizations sprung up around the latitudes of the Cancer and of the Capricorn, only to flourish for a short time, and perish when conditions were apparently propitious for a higher development. Reasons of various kinds have been assigned for this short life—immorality, luxury, infidelity, degeneracy, political oppression, and almost everything else which the fertile imagination of past and present-day writers could conjure up. All these reasons undoubtedly

[1] HUNTINGTON, ELLSWORTH, *World-Power and Evolution,* Yale University Press, 1919, New Haven, p. 42.

[2] BINDER, *op. cit.,* p. xi.

had something to do with the ruin of ancient civilizations, but they operated only indirectly, and were themselves results rather than causes. It is only recently that medicine, with its study of tropical diseases, has revealed the true cause—ill-health owing to the inability of former generations to combat disease-breeding parasites. For without physical health, no high and no permanent civilization is possible. If ill-health attends a people day after day, it lacks the ability to build up strong and vigorous bodies and large, sound brains. It is, consequently, compelled to reduce its activities to the absolutely necessary minimum, since a sick man does not act or think any more than he is compelled to in order to preserve life. No civilization can be built up, however, in that way. It requires great physical activity, and, above everything else, a clear and vigorous brain to invent schemes for freeing man from the thralldom of physical toil. For only in proportion as man succeeds in making nature do his work is he able to attain leisure and to save time and energy for the development of art, science, philosophy, and literature. Civilization has, consequently, a mental basis even in its material aspects of machinery and other labor-saving devices, and consists essentially in the ability to enjoy free mental activities along lines which give men pleasure, just because they are not needed for physical maintenance. These activities are, however, wholesome in proportion as the body is sound and vigorous, since out of the poorly nourished brain of a chronic dyspeptic or the disordered brain of a maniac all kinds of strange fancies proceed, which are neither sound nor sane. Physical health is, therefore, an essential element in the origination and maintenance of civilization." [1]

"No people have ever succeeded in rising above the level of savages unless it possessed at least fair health; where either economic or climatic conditions prevented health, no civilization could arise; and where it had arisen it was doomed whenever new conditions arose which undermined health.

"Health is, thus, the principal index to civilization, because

[1] BINDER, *op. cit.*, pp. 3-5.

it shows control over nature by society as a whole, and ability on the part of the individual to utilize these means of control for his own benefit. This control implies the ability to secure a suitable supply of food as regards quantity and quality, to counteract or avoid the endemic diseases, and thus to lay up a store of surplus energy." [1]

"From whatever point of view we look, consequently, at the individual or society, the problem of health always confronts us; and we may now sum up our results in a few principles.

1. Law of Progress: Progress is possible only with a surplus of vitality over the immediate necessary activities of life.

2. Law of Work: Work in the sense of telic endeavor and of the wisely controlled expenditure of energy is possible only with good health.

3. Law of Social Personality: The individual can grow into a social personality only in proportion as his health permits him to enter into mutually helpful and sympathetic relations with others.

4. Law of Civilization: Civilization progresses in direct ratio to the interdependence of persons and peoples—*i.e.*, on the interchange of mental and industrial products which result from a healthy individual and social life.

5. Law of General Development: Individuals and societies develop in proportion to their growth in self-reliance; and this depends upon their ability to attain health with the resultant confidence in their ability to control nature and their own destiny." [2]

We realize today that civilization is a fabric woven out of many and diverse strands, and students are loath to attach primary significance to any single factor. While any effort, therefore, to interpret civilization in terms of health must go the way of other unilateral explanations, the effort to do so in recent years serves both to indicate the trend of present-day thought and to emphasize the fundamental relationship between the two, apparently unrecognized for centuries.

[1] Binder, *op. cit.*, p. 65.
[2] *Ibid.*, pp. 77, 78.

THE EXTENT OF ILL-HEALTH IN THE UNITED STATES

Mortality rates have been used generally in the past as indices of health, chiefly because they have been the only reliable data available. Since it is quite possible for a community to have a low death rate and yet have a large proportion of its population suffer from disabling diseases, it is clear that morbidity rates would give a far more accurate picture of the physical state of the nation than death rates alone. Unfortunately, no complete or relatively accurate morbidity statistics are available for the United States or for any considerable part thereof. Existing morbidity reports from state departments of health include only the communicable diseases, and there is the further fact that not all physicians obey the law requiring the reporting of such diseases. Then, too, not all cases come to the attention of physicians. Morbidity rates are needed sadly in this country, and this is the next great step that must be taken in the field of vital statistics.

"There are two ways, however, by which a fairly satisfactory picture may be obtained of the health of a community. First, a cross-section investigation may be made; that is, several thousand homes may be visited by investigators during a relatively short period of time, to record the number of persons sick at that one time and the diseases with which they are disabled. This sampling is obviously inadequate to the extent that it reveals the disease situation at only one season during the year. Second, a record may be kept of the health of a particular group of persons in an industry or institution through an entire year." [1]

The Extent of Disabling Sickness.—Probably the most intensive and comprehensive investigation of morbidity in this country was made by the Metropolitan Life Insurance Company. During the years 1915, 1916, and 1917, representatives were sent into numerous towns and cities, scattered over seven different states, obtaining data on almost 600,000 persons, most of whom were people of small means employed in indus-

[1] Moore, Harry H., *Public Health in the United States*, Harper & Brothers, New York, 1923, pp. 33-34.

trial life. Approximately 2¼ per cent of the entire number of white persons canvassed were found to be so sick as to be unable to work. The average loss per person per year on account of sickness was 8.4 days. The company believes that, taken as a whole, these studies reveal a degree of sickness typical of most industrial communities in the United States throughout the year.

These conclusions are borne out for the most part by other studies, a few of which will be summarized briefly at this point. Investigations by the United States Commission on Industrial Relations in 1913-15, including a survey of the sickness prevalent among approximately a million workers of representative occupations, revealed an average loss to American wage-earners of about 9 days per year.

In October, 1916, the United States Public Health Service published the results of a sickness survey in North Carolina. The study was made in April of that year, a month somewhat favorable there for health. A total of 14,112 families, including 66,007 persons, was canvassed. Among these 1,881 cases of illness were found, equivalent practically to 3 per cent of the total number of persons enumerated.

On November 11, 1916, the City Club of Milwaukee made a sickness survey of the entire city, with the aid of various social workers. It was found that 10 per cent of the entire population of the city were sick, although manifestly many cases of venereal disease, tuberculosis, and other like afflictions were not reported. Of the 40,000 cases of sickness, 13,600 were wage-earners, of which 5,090 were at home unable to work. This amounts to 2.7 per cent of the total number of wage-earners.

The Pennsylvania Health Insurance, 1919, found 4.2 per cent of the population to be seriously sick at all times, and 1.5 per cent to be disabled. The average number of days of disability per year for all persons was placed at 5.7, and for persons fifteen years of age and over at 8 days.

Official commissions investigating sickness in Ohio and Illinois in 1919 found a rate of sickness at 3 per cent of the

population, and the loss of time by wage-earners to average between 8 and 9 days a year.

In a rubber manufacturing company employing 18,000 persons for the year ending October 31, 1920, records were kept of sickness among factory workers causing a disability of one day or longer. The results were as follows: there were virtually two cases of disabling sickness per person per year among these factory workers, and the average loss of time per person per year was, among the women, 13.8 days, and among the men, 9.3 days.

The United States Public Health Service, with the help of the medical research department of a large corporation in the Middle West, found that among 1,282 office workers for the year ending January 31, 1921, the average loss per person employed was 8.15 days, and that during the year there were, on the average, two cases of sickness per person.

Dr. Sydenstricker is of the opinion that between 8 and 9 days of annual loss from sickness is a justifiable estimate based on the United States Public Health investigations.

The committee on industrial waste of the Federated American Engineering Societies appointed by Herbert Hoover in January, 1921, reached the conclusion that, of the 42,000,000 persons gainfully employed at that time, there was probably an average loss of more than 8 days per person per year on account of illness disabilities.

Evidence from one other source ought to be considered at this point. Reports from the Surgeon-General of the U. S. Army indicate that there is always a fairly constant rate of sickness. This is called the non-effective rate, meaning the proportion of men unfit for duty. Over a series of years, the army non-effective rate runs regularly between 2 and 3 per cent. When it is remembered that soldiers are selected on the basis of physical fitness, and that those developing chronic diseases are discharged, it is apparent that a similar rate for the general population cannot be suspected of being an overstatement of the facts.

It seems reasonable to conclude, on the basis of the various studies cited, that there is a fairly definite percentage of

the population, ranging between 2 and 3 per cent, which is at all times incapacitated because of illness. At times the rate may drop below this, but during epidemics it may rise as high as 8 or 10 per cent. During the influenza epidemic in 1918, among 148,245 persons covered, the case rate for this disease alone was 29.4 per cent.[1]

In addition to those unable to work because of illness, there is always a constant percentage who feel the effects of illness but continue to work. This is usually estimated at from 2 to 4 per cent.

It appears, then, that the total acknowledged sickness or non-effective rate for the entire population may be placed at from 5 to 6 per cent. This means that between 5,000,000 and 6,000,000 people (only three states have more population than this) are ill constantly; that more than 1 million of the 42 gainfully employed are unable at any one time, because of disabling sickness, to be at work; that another million are seriously ill, although at work.

Defects and Minor Ailments.—Beyond disabling sickness are defects and minor ailments of all kinds which keep people on a low plane of vitality and rob them of health and efficiency, and which not infrequently lead to more serious consequences. In other words, what is the physical condition of the 95 per cent of the population who are not ill, but who go about their work presumably fit?

The First National Health Inventory.—Prior to the war, local health surveys had been made, school children had been examined, and life insurance companies had conducted investigations, but such studies received scant public attention and were discredited in various popular quarters on the charge that they were carried on only to "make more work for the doctors." The selective military draft law of 1917 afforded the opportunity for a health inventory on a national scale, and its disclosures furnished us with a comprehensive and authentic audit of the health status of the American people.

Of the several million men between the ages of eighteen

[1] *Annual Report, 1919, United States Public Health Service,* Washington, D. C.

and thirty who were examined, 21 out of every 100 were rejected and sent home, approximately one-third were found to be unable physically to perform full military duty, and only 53 per cent were accepted as fully meeting the military standard. These figures must not be used indiscriminately. It must be remembered that many classified as defective were so listed on account of minor defects, such as insufficient height and weight, which in no way interfere with their effectiveness in many of the ordinary tasks of life. On the other hand, a considerable number of men were taken into the army who were suffering from abnormalities and diseases which required immediate hospital treatment.

Examinations of the Life Extension Institute.—This organization promotes periodic medical examinations for the purpose of discovering and correcting defects and diseases which cause premature death. The thorough inspection of 5,000 persons applying to the institute for a physical examination showed a surprising degree of ill-health and defectiveness. Of the 5,000, none was found worthy to be grouped in Class 1, which included those having no physical defects. One-tenth of 1 per cent were placed in Class 2, composed of those with "minor defects requiring observation or attention." Sixteen per cent were put into Class 3, consisting of those having "moderate defects requiring hygienic correction or minor medical, dental, or surgical attention." Twenty-five per cent fell into Class 4 as having "moderate defects requiring medical supervision as well as hygienic correction." Slightly more than half, 51 per cent, were grouped in Class 5 with "advanced physical impairment requiring systematic medical or surgical attention." The remainder, 8 per cent, Class 6, had "serious physical defects requiring immediate surgical or medical attention."

It is true, of course, that the 5,000 examined comprised a selected group of persons who had had some warning probably that their physical condition was not satisfactory. Yet they were people who, for the most part, were not receiving medical attention, but rather going about their daily business. Whatever one may conclude about the selected nature

of this group, it is rather surprising that not one was found without some physical defect.

Examination of Children.—In 1918, Thomas D. Wood, chairman of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, submitted the following estimates on the physical condition of the school children of the United States: [1]

Over 1 per cent—250,000, at least—are handicapped by organic heart disease.

At least 5 per cent—1,000,000 children—have now or have had tuberculosis, a danger often to others as well as to themselves.

Five per cent—1,000,000 of them—have defective hearing, which, unrecognized, gives many the undeserved reputation of being mentally defective.

Twenty-five per cent—5,000,000 children—have defective eyes. All but a small percentage of these can be corrected, and yet a majority of them have received no attention.

Fifteen to 25 per cent—3,000,000 to 5,000,000 children—are suffering from malnutrition—a serious barrier to healthy development.

From 15 to 25 per cent—3,000,000 to 5,000,000 of them—have adenoids, diseased tonsils, or other glandular defects.

From 10 to 20 per cent—2,000,000 to 4,000,000—have weak foot arches, weak spines, or other joint defects.

From 50 to 75 per cent—11,000,000 to 16,000,000—have defective teeth, and all defective teeth are more or less injurious to health.

Seventy-five per cent—16,000,000 of the school children of the United States—have physical defects which are potentially or actually detrimental to health.

"In 1923, Dr. Wood wrote that he believed these figures were still essentially accurate for the country at large, although he supposed that the percentages would be considerably lower in a few of the cities where rather intensive programs of health care have been undertaken during recent years." [2]

THE ECONOMIC COST OF DISEASE

It seems profitable at this point to consider briefly the economic cost of disease, for if the people of the nation come to an understanding of its cost in terms of money, it may be possible to obtain more adequate financial support for the

[1] Quoted from Moore, *op. cit.*, pp. 56-57.
[2] *Ibid.*, p. 57.

constructive measures now being advocated to deal with disease. Accurate conclusions of the cost of disease cannot be made, but there is perhaps sufficient knowledge at hand to warrant limited computations tentatively satisfactory. Several interesting attempts to do so have been made, and these will be summarized here.

Professor Fisher's Estimates.—In 1909 there appeared Professor Irving Fisher's now well-known report on "National Vitality, Its Wastes and Conservation," prepared for the National Conservation Commission. In this report Professor Fisher makes some interesting estimates. He places the total cost of preventable deaths at a billion dollars a year, the loss of wage-earners because of illness at a half a billion, and the cost of medical attention at from a half to one and a half billion dollars a year. "The actual economic saving annually possible in this country by preventing needless deaths, needless illness (serious and minor), and needless fatigue, is certainly far greater than one and a half billions, and may be three or four times as great." [1]

Dr. Fisk's Conclusions.—Dr. E. M. Fisk, medical director of the Life Extension Institute of New York, estimates that in 1923 the economic loss in this country annually from preventable disease and death was over $3,000,000,000, of which $1,800,000,000 was among the gainfully employed.[2]

Dr. Moore's Computations.—Dr. Harry H. Moore, of the United States Public Health Service, has made recently (1923) an interesting attempt to approximate the several more important items in the national bill for disease. He selects four of these items for consideration—first, the cost of serious illnesses necessitating the attention of physicians; second, the cost of decreased efficiency due to minor ailments; third, the cost of medicine; and fourth, the cost to society of premature deaths.

The total cost of illnesses necessitating the attention of

[1] Quoted from Marshall, Wright, and Field, *Materials for the Study of Elementary Economics, op. cit.*, p. 130.

[2] Fisk, *op. cit.*, p. vi.

physicians is placed at $1,700,000,000 annually. In making this estimate, $782,000,000 is allowed for fees of doctors and nurses, $300,000,000 for the maintenance of hospitals, and $1,000,000,000 for the loss of earnings by workers who are ill. More than $300,000,000 is then deducted apparently for the sake of being conservative, leaving a balance for this item of $1,700,000,000.

In estimating the cost of decreased efficiency due to defects and minor ailments, it is assumed that 20 per cent of those gainfully employed are thus handicapped, and are on an average not more than 75 per cent efficient. Reckoned on the basis of the annual wage and salary bill of the nation, the total annual loss to industry is more than a billion and a half.

"According to reports collected by the Census Bureau in 1923, the value at place of manufacture of all medicines for the year 1921 was over $193,000,000, to which 80 per cent may reasonably be added for freight and expense, jobbers' profits, retailers' profits, advertising, and other expenses of marketing, indicating that at least $345,000,000 per year is being spent by the people of the United States for medicines alone."[1]

In analyzing the cost of premature deaths, Dr. Moore revises Professor Fisher's earlier figures which placed the loss to society of each such death at $1,700 to $2,500. With 560,000 preventable deaths annually in the United States, the total for this item would be almost a billion and a half.

The total of these four items exceeds $5,000,000,000. That these various estimates are little more than guesses and that they may vary by several hundred million dollars is not important. The reckoning is conservative at every point. When data more nearly accurate become available later, the total amount probably will be greater. It must be very clear, too, that there are various other items which are not included in this reckoning.

After citing these figures, it is impossible to resist the temptation to add that the total amount spent annually through various public health agencies is $60,000,000.

[1] Moore, *op. cit.*, p. 66.

THE BEARERS OF THE BURDEN

The Distribution of the Burden.—Who pays the costs of ill-health? Manifestly, a part of the burden falls, indirectly at least, upon every man, woman, and child in the nation. But the costs that have been pointed out are not averaged over the entire population as statistics would suggest. John Jones was indisposed this morning, tomorrow he is back at work. His allotment of illness is merely mathematical. This is the terrifying aspect of disease, that it selects certain victims upon whom it wreaks its full force.

Statistics show that the average duration of illness of those who are sick ranges between 35 and 40 days per year. The seven sickness surveys of the Metropolitan Life Insurance Company, reference to which has been made, show the variations in the length of periods of illness which occur. Of those who were sick, 39 per cent were sick for less than 4 weeks; 10 per cent for from 1 to 2 months; 4.8 for from 2 to 3 months; 7.8 for from 3 to 6 months; 6 per cent for from 6 months to a year; 25.8 per cent for more than a year; and 5.9 per cent not specified. From this it appears that the real burden of disabling illness, as resulting from sickness of lengthy duration, falls upon a limited proportion of the population, but with crushing force.[1]

The financial burden of disease is divided correspondingly unequally, for the longer the illness the greater the loss in wages and the expenditures for treatment. According to six studies made in 1918 by the Bureau of Labor Statistics and one by the Philadelphia Bureau of Municipal Research, it appears that families of wage-earners in industrial centers spend from $32 to $53 a year for health, in addition to receiving gratuitous care in public and private hospitals, which Dr. S. S. Goldwater, writing in the *Medical Record* of March 8, 1919, estimates for New York as costing $22,000,000 a year.[2]

These again are averages, and what is involved in the case of concrete families is well illustrated by a study of 365

[1] Quoted from SADLER, *op. cit.*, p. 394.

[2] DE SCHWEINITZ, KARL, "Sickness as a Factor in Poverty," *National Conference of Social Work, Annual Proceedings*, 1919, Chicago, p. 163.

families to which the Visiting Nurses' Society of Philadelphia was called during the month of July, 1918. While the average expenditure for health was $47 per family, the real burden of sickness fell upon 50 families. The cost of their illnesses was equal to more than one-half of the money spent for sickness by the entire group. Although 26 of these 50 families had incomes of less than $30 a week and 15 of them less than $20 a week, their expenditures for health ranged from $100 to $416. Two families with incomes of $20 per week had doctor bills of $200 and $400, respectively. Similarly, 7 per cent of the families with sickness found in a survey of forty-one city blocks made by the Illinois Health Commission were found to have expenditures for sickness equal to more than half of their entire income.[1]

Sickness and Poverty.—What do such families do? "They do what Thomas Calcheck did when he became too ill to support his family. They exhaust their savings. He had $700. Then they borrow on their life insurance. This was the policy that Calcheck followed. Then they extend their credit and borrow from their friends. Everybody liked Calcheck and creditors and friends were liberal to the point of making gifts. Beyond this most families do not have to go. Their friends and relatives are able to provide for them. The children and the wife work. It is only when every possible source of help has been exhausted that they do what Calcheck did—that they apply to a social agency for assistance. For four years Calcheck and his family were under the care of the Society for Organizing Charity. For the first seven months the society supplemented the family income with a total of $129. During the remaining three years and four months the society's share of the family's budget was $1,800, or $540 a year. Then Calcheck died and widowhood was scheduled as the principal physical factor in the family's distress, although it was sickness that had caused the widowhood and although two of the children need constant medical attention." [2]

In all countries, at all ages, it is sickness to which the

[1] DE SCHWEINITZ, op. cit., p. 158.
[2] *Ibid.*, pp. 158-159.

greatest bulk of destitution is immediately due. Sickness is so intimately related to destitution that it is often impossible to determine whether it is cause or effect. Twenty years ago, social agencies were in the habit of attributing about one-fourth of the distress known to them to sickness. In the years since, with fuller case investigations and changes in tabulation which charge resultant conditions of sickness to the primary factor, their percentages have been revised upward continually, first to 40 per cent and more recently to one-half and more, thus substantiating a statement made a number of years ago by one of the foremost men in the field of social work. "Ill-health," said Edward T. Devine, "is perhaps the most constant of the attendants of poverty. . . . An inquiry into the physical condition of the members of the families that ask for aid, without for the moment taking any other complications into account, clearly indicates that, whether it be the first cause or merely a complication from the effect of other causes, physical disability is at any rate a very serious disabling condition at the time of application in three-fourths of all families that come under the care of the Charity Organization Society, who are probably in this respect in no degree exceptional among families in need of charitable aid." [1]

Although the general subject of crime and behavior difficulties is omitted from this volume, it might be pointed out that there is obviously a marked relation between the burden of diseases and socially undesirable conduct. The effect of the existence of chronic disease in a family upon the mental content of its members, and the subsequent influence upon their behavior, opens an interesting field of study, both for the psychiatrist and for the health worker.

Recessive Sickness.—There is a type of sickness highly important in this connection but quite generally overlooked. Karl de Schweinitz, the secretary of the Philadelphia Society for Organizing Charity, has borrowed from the biologists the term "recessive" and applied it to sickness "which only the diagnostician can recognize, which the patient himself overlooks, and which, if included in health surveys would bring

[1] Devine, Edward T., *Misery and Its Causes*, p. 54.

the percentage of sickness in the general population far above the proportion of three in one hundred.

"This is the sickness that people do not consider important enough to justify consultation with a physician, the sickness that expresses itself in a fleeting pain, in an occasional ache, and which preying on vitality, results in an inability to think and act at the top of one's power. This kind of illness is an almost universal experience; yet by reason of its very nature it is difficult to discover or to subject to statistical analysis. Social agencies learn about it usually only when the disease has reached the advanced stage in which definite and easily recognizable symptoms develop.

"An illustration of this is to be found in the experience of Antonio Cardeleo, who for years has been an unsatisfactory sort of person. He was lackadaisical and without energy, a 'no account' fellow who seldom had employment and who frequently deserted his family. The cause of his depleted vitality and consequent unproductiveness was not discovered until he returned home from one of his periodic absences, suffering from a hemorrhage. A diagnosis of tuberculosis in an incipient stage was made. Three months elapsed before the sanatorium could admit him. During this time he was under the instruction of a dispensary, and when his turn to go away arrived he had made such progress in learning how to regulate his life and diet that it was possible for him to return to work. A job as a railroad switchman was secured for him. This position he has held ever since. He is buying his own home and has continued to live with his family. Obviously many things entered into making this man into a productive citizen, but among them, certainly, the restoration of his vitality played an important part.

"Even more elusive was the cause of Joseph Brown's inefficiency. He was described by one visitor as looking like a Greek God, having the sort of physique which made people instinctively say of him—there's a man for the army. Nevertheless, he was ineffective. The neighbors said he was lazy and so indeed he appeared to be. It was only when his condition became so serious that his power to grip things with his hands

failed that tuberculosis of the spine was discovered. The disease has since been arrested sufficiently to enable him to work regularly. . . .

"Perhaps the first to recognize the dangers of recessive sickness has been the successful business man. Against the poverty that comes from a loss of vitality the capable executive guards himself vigilantly. He is careful about what he eats. He is particular about relaxation and recreation. He focuses every effort toward keeping himself at the peak of his energy during the hours when he must make decisions. Any casual disorder is a red signal that meets with instant attention.

"But the big business man or the successful professional man is the exception. The rule is the poor man who must often perforce neglect the aches and the pains which accompany his loss in vitality, without the means or the courage to learn why he finds himself less and less able to do his best. Even worse, he may never have known what it is to be at one's best. Sickness, like another Dracula, has preyed upon his life blood from earliest childhood until he becomes what social case workers find so many families to be—spiritless, hopeless, ineffective, without the confidence that comes from physical well-being and lacking the impulse toward accomplishment that springs from accomplishment. Thus he is steadily drawn deeper and deeper down into the perdition of unproductiveness." [1]

The work of the world is done by healthy persons. The progress of the world has resulted from the contributions of those with vitality over and above that which they needed for the routine of life. The drag upon society in its forward march is from the sickly and the inefficient.

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CHAPTER VIII

THE CONTROL OF DISEASE

EARLIER THEORIES OF DISEASE

Man interprets the problems which confront him on the basis of the phenomena which he understands. Primitive man knew from experience that his welfare could be affected for good or evil by other persons. An enemy could injure him directly. When sickness came upon him, therefore, it was logical to ascribe it to some personal enemy. Since it resulted often in serious suffering and disability, which he was powerless to overcome, it became necessary for him, in order to preserve his self-esteem, to rationalize that enemy into a being with superior powers. Thus arose the belief, held from time immemorial, that disease was due to supernatural agencies such as gods and devils, apparently invoked by the magical incantations of an enemy. An epidemic was the visitation of some evil spirit analogous to the onslaught of a warlike human foe. The Jews, on the other hand, considered disease, epidemics, and plagues as exhibitions of the wrath of an offended Jehovah—a just chastisement for sin.

These two views—one of demoniacal malice, the other of divine visitation—were championed and shared for centuries. Martin Luther, for example, leaned toward the demoniacal theory. He firmly believed that "pestilence, fever, and other severe diseases were nought else than the devil's work." Cotton Mather, in contrast, considered disease as the scourge of God for the sins of the world, the result of disobedience to God who afflicts sinners or allows the devil so to do. Both theories have come down to our own times. When, for example, the newspapers in the year 1846 carried the story of a "painless" operation which had been performed in America with the help of ether, good people shook their heads. To them it seemed contrary to the will of God that man should escape the pain which was the share of all mortals, and it took a long time

before the practice of taking ether and chloroform for operations became general. Many other and more recent illustrations of the popular acceptance of one or the other of these theories might be cited.

These conceptions of the origin and nature of disease are reflected in the forms of treatment developed. If sickness is due to the incantations of an enemy, then the proper thing to do is to produce a stronger counteracting magical influence. It is for this reason that among all primitive peoples the medicine-man and the magician occupy an important place. If disease be due to the malice of evil spirits, then the hostile demon must be propitiated, or combated, by obtaining the support of stronger gods, or overcome by the magician, or driven away by the medicine-man. The Samoyed of Asia, for example, attempted to frighten away demons of disease by donning the skin of a beast and by shouting, raving, slapping the hands, and by assuming in other ways a terrifying aspect. To prevent a recurrence of the disease—in other words, to keep the evil spirits away—the medicine-man gave the patient a fetish to be hung about the neck or to be otherwise worn upon his person.

Primitive preventive medicine logically placed great emphasis upon the use of charms and incantations, of amulets and sacred symbols. As late as in the seventeenth century, Sir Kenelm Digby proposed as a remedy for fever that the physician pare the patient's nails, put the parings in a little bag, hang the bag around the neck of a live eel, and place the eel in a tub of water. As a matter of fact, the practice survives to the present day in the horse-chestnut carried in the pocket to ward off rheumatism, or the bags of camphor worn around the neck during the influenza outbreak in 1918.

Apparently there were times when the believers were weak in the faith. There has been unearthed in recent years a formula used in the days of early Babylonian civilization to call down the wrath of God on the worm causing toothache. The text advises the curse that is to be uttered, that it is to be uttered thrice, but while the curse is taking effect, the aching tooth shall be treated with a mixture of henbane and resin.

Another fascinating theory was to the effect that epidemics were caused by the position and movements of the heavenly bodies or other astral phenomena. This notion was advanced early, and retains its exponents down to the present day. No less a personage than Noah Webster believed that earthquakes, volcanic eruptions, and similar disturbing phenomena had something to do with outbreaks of disease.

One of the most consistent theories of the causation of disease was to ascribe it to pestilential air. As enunciated by the great Hypocrates, it attributed plagues and pestilence to the influence of miasms, subtle emanations in the atmosphere, neither less mysterious nor more actual than the devils of earlier imaginations. It was believed, for example, that the plague of Athens was checked by lighting fires in the streets to purify the atmosphere from its deadly miasms. As late as 1865, the leading medical authorities of Great Britain taught that the bodily discharges of a cholera patient were not dangerous until they had become decomposed and generated the miasms of disease. While many persons accepted the bad-air explanation, there was considerable difference of opinion as to whether the bad air was caused by evil spirits, an angry god, the juxtaposition of the heavenly bodies, terrestrial disturbances, or climatological phenomena. Moreover, the belief as such fitted in with the very old theory of spontaneous generation, and out of it grew fallacies which still found wide acceptance in the middle of the nineteenth century.[1]

It is interesting to recall in this connection that when the building of tuberculosis sanatoria was first begun in this country, there was much objection among the laity, and not infrequently among medical men of the time, to the location of such institutions near residences. This was due to the old and deeply founded belief in the miasmatic dissemination of disease. So great were these objections twenty years ago that frequent lawsuits resulted therefrom. It was claimed by owners of the property in the neighborhood that the value

[1] Winslow, C.—E. A., *Man and the Microbe*, Funk & Wagnalls, New York, 1924, pp. 3-5.

of their properties would be greatly depreciated by the sanatorium.

SOME EARLIER PRESCRIPTIONS

Theories such as these are neither more strange nor humorous than the treatments prescribed. In a solemn and pretentious volume entitled *English Pharmacopœia,* and dating to seventeenth-century England, one discovers that the lungs of foxes are very beneficial to people suffering from asthma; that moss from the skull of a victim of violent death is a meritorious remedy; that Vigo's Plaster, fabricated from viper's flesh, mixed with live frogs and worms, has a marked therapeutic action on many ailments; that human sweat, urine, and the saliva of a fasting man possess important healing properties; and that the annoyances and harassments of dysentery will succumb to the ingestion of cat ointment and oil of puppies, boiled with earthworms.[1]

Similarly one reads, albeit with tongue in cheek, the therapeutic brews which Puritan ingenuity devised. There was, for example, the Water of Life, given for fevers, a few drops at a time, and also as a tonic for health:

> Take Balm leaves and stalks, Betony leaves and flowers, Rosemary, red sage, Taragon, Tormentil leaves, Rossolis and Roses, Carnation, Hyssop, Thyme, red strings that grow upon Savory, red Fennel leaves and root, red Mints, of each a handful; bruise these hearbs and put them in a great earthern pot, & pour on them enough White Wine as will cover them, stop them close, and let them steep for eight or nine days; then put to it Cinnamon, Ginger, Angelica-seeds, Cloves, and Nuttmegs, of each an ounce, a little Saffron, Sugar one pound, Raysins solis stoned one pound, the loyns and legs of an old Coney, a fleshy running Capon, the red flesh of the sinews of a leg of Mutton, four young Chickens, twelve larks, the yolks of twelve Eggs, a loaf of white-bread cut in sops, and two or three ounces of Mithridate or Treacle, & as much Muscadine as will cover them all. Distil al with a moderate fire, and keep the first and second waters by themselves; and when there comes no more by Distilling put more Wine into the pot upon the same stuffe and distil it again, and you shal have another good water. This water strengtheneth the Spirit, Brain, Heart, Liver, and Stomack. Take when need is by itself, or with Ale, Beer, or Wine mingled with Sugar.[2]

[1] DeKruif, Paul H., *Our Medicine Men,* The Century Company, New York, 1922, pp. 78-79.

[2] Earle, Alice Morse, *Customs and Fashions in Old New England,* Charles Scribner's Sons, New York, 1893, p. 337.

Certainly no one would doubt that it strengthened the spirit, especially when taken with ale, beer or wine.

Melancholy was regarded as a disease by the lonely colonists and no doubt there was a general demand for the following "Pretious water to revive the Spirits:"

> Take four gallons of strong Ale, five ounces of Aniseeds, Liquorish scraped half a pound, Sweet Mints, Angelica, Eccony, Cowslip flowers, Sage & Rosemary Flowers, Sweet Marjoram, of each three handfuls, Palitory of the VVal one handful. After it is fermented two or three dayes, distil it in a Limbeck, and in the water infuse one handful of the flowers aforesaid, Cinnamon and Fennel-seed of each half an ounce, Juniper berries bruised one dram, red Rosebuds, roasted Apples & dates sliced and stoned, of each half a pound; distil it again and sweeten it with some Sugarcandy, and take of Ambergreese, Pearl, Red Coral, Hartshorn pounded, and leaf Gold, of each half a Dram, put them in a fine Linnen bag, and hang them by a thread in a Glasse.[1]

One must sympathize with the earnest longing to revive the spirits, but it does appear that the four gallons of strong ale should have answered the purpose, without recourse to the herbs and fruits. It appears, too, that the Puritan, while he might follow Cotton Mather in conceiving of disease as a scourge for sin, with repentance and sacrifice and prayer as the logical cure, agreed also with the Babylonian who used his medicines while the curse was manifesting itself.

THE ERA OF SPECULATION

As long as disease was attributed to the malicious intervention of evil spirits, human effort to understand it was fatuous if not irreverent. It was, therefore, a great step forward to conceive of an epidemic as due to miasms rather than spirits, for it opened the way for speculation. "As is the case throughout the whole realm of science, it is to the Greeks that we owe our first rational theories of the nature and origin of disease. The science which burst into a sudden blaze of glory on the rocky islands and capes of the Ægean Sea was often crude and faulty; but it was science. It involved the assumption of natural physical causes for natural physical phenomena. Even when the assumptions were erroneous they

[1] Earle, *op. cit.*, p. 340.

could be tested and proved, elaborated or replaced by better ones. They gave up a definite basis for advance while the recourse to a theory of irresponsible supernatural forces left no door open for the progressive working of the human intellect."[1]

Much of our knowledge of bacteriology or "germs" is due to speculative discussions during these early centuries about spontaneous generation and the cause of fermentation. Early Greek, Roman, Hebrew, and Arabic philosophers accepted the popular belief that new generations of animals and plants—continually and as a regular everyday occurrence—sprang into existence by the sudden transformation of the lifeless substance of dead animals and plants.

These beliefs came down through the Middle Ages. In the sixteenth century, Cardano stated that water gave rise to fish and animals and was also the cause of fermentation. In the seventeenth century, Van Helmont gave directions for producing artificial mice, and other writers described the production by water of small animals. The whole problem was widely discussed even into the nineteenth century.

Meanwhile in 1546, Fracastoria of Vienna had proposed the idea that diseases might be spread by particles too small to be seen by the eye, but he had no clear conception as to what they were like, nor did he have any evidence to support his theories. Apparently, Kircher, a Roman Catholic monk, was the first (1761) to see the organisms which we now call bacteria, and he too speculated on the possible causal relationship of these "invisible" worms to disease.

The Advent of the Microscope[2].—Further speculation in this direction awaited additional facts. These were destined to be revealed by the use of a new invention—the microscope. The use of a lens for magnifying purposes is ancient, but the first compound microscope was made probably in 1590 by a

[1] WINSLOW, *op. cit.*, p. 3.

[2] For a short, readable, and interesting account of the importance of the microscope and the wonders of microscopic life the reader is referred to THOMSON, J. A., *Outline of Science*, G. P. Putnam's Sons, New York, 1922, Vol. II, Chap. IX.

Dutchman, Zacharias Jansen. It did not become an effective instrument until toward the middle of the eighteenth century, but when it did, the result was the virtual discovery of the invisible world of life.

The pioneer explorer in this new world was Anthony von Leeuwenhoek (1632-1723), a merchant in Holland, who has been called the "Father of Microscopic Discovery." Using a simple lens no bigger than a dried pea, he was able to see in water and infusions minute living bodies which we now know were bacteria, and which he called "animalcules." He found these "animalcules" in many objects which he examined, and his observations covered a wide field. Other microscopists soon found similar bodies in many substances, and by the beginning of the eighteenth century their existence was quite generally known. These discoveries were taken for the most part to mean that these minute living organisms developed "spontaneously" from dead matter.

First Statement of Germ Theory of Disease.—Apparently the first to formulate the germ theory of disease in anything like its modern form was an Austrian physician, Plenciz, in 1762. The most important idea brought out by Plenciz was the specificity of the disease germs—that is, the conception that each disease has its own specific agent which causes that disease and no other. He also explained that the microscopic agents might be distributed through the air, enter the body and multiply there, producing the disease, and might later spread to other human beings by means of discharges, excreta, etc. His writings sound strangely modern, considering that they were pure speculation and were written a full century before the germ theory of disease was definitely established. Plenciz's arguments, however, were lost sight of in the course of subsequent events, and by some were even regarded as the productions of an unbalanced mind. For example, as late as 1820 we find Ozanam expressing himself on the subject as follows: "Many authors have written concerning the animal nature of the contagion of disease; many have indeed assumed it to be developed from animal substances, and that

it is itself animal and possesses the property of life; I shall not waste time in effort to refute these absurd hypotheses."[1]

As such a statement would indicate, little progress was made for almost a century after Plenciz. Men wondered, imagined, speculated, but no one knew how to study these tiny objects. Further improvements in microscopy had to be made. Moreover, the public attitude during these years was none too cordial toward scientific investigation. The dignified, well-to-do middle class, which dominated the latter part of the eighteenth and the opening decades of the nineteenth century, while willing to utilize the many practical applications of the great scientific discoveries, were rather distrustful of the principle of scientific inquiry. The director of the United States Patent Office, who in 1830 suggested that the office be abolished because everything that possibly could be had already been invented, is perhaps representative of the prevailing state of mind of the period. It was a bitter and relentless warfare with the clerical authorities of Catholic and Protestant countries until the anatomists and physiologists at last obtained permission to dissect bodies and to substitute a positive knowledge of our organs and their habits for the guesswork of the mediæval quack.

THE DEVELOPMENT OF THE SCIENCE OF BACTERIOLOGY

While the main point which occupied the attention of scientific men for two hundred years after Leeuwenhoek's discoveries was the origin of these "animalcules," the thing which ultimately brought microscopic organisms into general prominence and set so many students at work with them was the idea that they were related to disease. As has been intimated, the idea had been suggested repeatedly since the seventeenth century, but discredit for the most part attached to it until the fifth decade of the nineteenth century, when the conception was again revived. This time, thanks to the knowledge that had been accumulating gradually and the painstaking researches of a number of very able men, the new

[1] Abbott, A. C., *Principles of Bacteriology*, Lea & Febiger, Philadelphia, 1915, p. 21.

science got started on the right track. The new master mind was Louis Pasteur, a French chemist, who was led finally to take up the subject, not to leave it until it had been well launched on its startling career.

The Period of Fundamental Discoveries.—The years 1860-80 constitute a period of fundamental discoveries which laid the foundations for the new science. It was around Pasteur that these discoveries centered. While a young man, he became interested in the phenomena of fermentation and was able to demonstrate that it was due to biological agencies, that there were many types of fermentation, and that each type was caused by its own specific agent. Then, in 1865, he was approached by some silkworm raisers for help in their dilemma with a serious disease, known as pebrine, which bade fair to ruin the silk industry of southern France. He accepted the challenge, and in a few years, although not without hard work and in the face of considerable ridicule and opposition, he was able to show conclusively that pebrine was due to microörganisms. This discovery, besides saving the silk industry of France, was highly significant because it was the first time that a specific microörganism had been shown to be associated with a definite disease.

Many scientists regarded this as final proof of the germ theory of disease, but the conclusion was not accepted universally, and for some years a heated dispute raged. Medical men in particular were inclined to receive these discoveries with extreme incredulity, and Pasteur's struggles to convince them that his researches revolutionized their conception of disease are illuminating and interesting. Their opposition to Pasteur was not so much based on the fallacy of his contentions as on the ground that he was a chemist, not a doctor, and hence could know nothing of disease. But he battled on with splendid determination, combating the appalling ignorance of his opponents with patience and persistence.

The turning point in the attitude of interested professional men toward Pasteur's work came as a result of the successful application of his theory to surgery and his own dramatic

demonstration of the possibility of vaccinating cattle against anthrax. In 1867, Joseph Lister, who introduced practical surgery, put the idea of the germ theory to practical use in his insistence that inflammation and pus formations which so often accompanied wounds must be due to microörganisms and could be prevented, therefore, if germs were excluded rigidly from wounds. Lister's technique proved so successful that it robbed the operating room and maternity ward of the hospital of their earlier terrors, saved the lives of countless people, and demonstrated anew that certain diseases could not occur in the absence of microscopic life.

Meanwhile Davaine, a French pathologist, attacked the problem of anthrax, a dreaded animal disease, along the lines suggested by Pasteur's researches. He concluded that the countless swarms of rod-like microörganisms found in the blood of anthrax victims must be the cause of the disease. His experiments were not conclusive, but the subsequent independent researches of Pasteur and Koch (1876-7) furnished final proof of his contentions. Pasteur's demonstration in regard to anthrax had a rather dramatic staging. His medical and veterinary opponents induced him to stage a public experiment, hoping that its failure, which they believed to be certain, would finally discredit him and leave them to the peaceful practice of their old methods. The plan, however, proved a veritable boomerang. Pasteur took a large number of sheep and divided them into two groups. The first he inoculated with his anthrax vaccine; the second was left without treatment. A certain number of days after the vaccination of the first group all of the sheep were injected with a virulent culture of anthrax microbs. All of the sheep which had not been previously inoculated died in a few days. But, to the dismay of his opponents, all of the vaccinated ones survived without symptoms of the malady. It is unnecessary to add that this beautiful experiment created confusion in the ranks of the opposing cults.

The Period of Extended Development.—It had taken a genius like Pasteur some thirty years to establish the fact that

these microörganisms are the cause of certain diseases and to place two animal diseases, pebrine and anthrax, definitely in the list of germ diseases; but it required only a very short time for a number of other important diseases to be classed in the same list, not on the basis of speculation, but as demonstrated truths. Shortly after 1880, Koch found the germ causing tuberculosis, in 1883 that causing cholera was identified, and the following year, those responsible for typhoid fever and diphtheria were unmasked. Fifteen years later, most of the diseases which are now known to be caused by microorganisms had been investigated successfully. If the two decades after 1860 are the period of fundamental discoveries in bacteriology, the two after 1880 were an era of extended development.

The tests imposed by these investigators upon themselves were so rigid that the results obtained shattered the last vestiges of doubt. Koch stated that before we can be sure that a given germ was responsible for a particular disease it was necessary, (1) to find it present in large numbers in every case, (2) to take it and make a pure culture in some substance, (3) to inoculate a subject with the pure culture and produce the disease, (4) to find again large numbers of the germ in the inoculated subject. Because of the concise form in which Koch stated these requirements and because of the emphasis which he laid upon them in his work, these tests are generally known today as Koch's postulates.

While the last twenty years have witnessed the discovery of few new disease-producing germs, a great deal of progress has been made in another aspect of the problem,—*i.e.*, an understanding of the body's defensive mechanisms against invading microörganisms. This will be reserved for discussion in the succeeding chapter. On the whole, since 1860 the triumphs of bacteriology have gone steadily forward to the recent brilliant studies conducted at the Rockefeller Institute in New York on yellow fever and influenza. Methods of research have been broadened and altered in detail, but their general lines were laid down by the founder of bacteriology sixty years ago.

SOME FACTS ABOUT BACTERIA [1]

It is rather difficult to classify living organisms consisting of a single cell which suffices for all their life processes, nor is it necessary for our purposes to attempt it. Those which cause infectious diseases may be divided into two groups—*viz.*, protozoa and bacteria. The former belong to the animal, the latter to the plant, kingdom. A few diseases, such as malaria, yellow fever, amebic dysentery, and the sleeping sickness of Africa, apparently result from infection by protozoa. The great majority of the diseases of human beings and animals, as well as some plant diseases, are due to bacteria. So closely have bacteria been associated with disease that to the public mind bacteria and disease germs are considered identical, and in popular speech, bacteria, germs, and microbes are used indiscriminately.

Recently it has been found that some diseases are produced by organisms so minute that they cannot be recognized and classified. They are known as ultra-microscopic organisms, or more generally as "filterable viruses," because they are so tiny that they will pass through the pores of a fine porcelain filter which holds back all microörganisms visible under the microscope. Among the diseases probably caused by them are the foot-and-mouth disease, pleuropneumonia, sheep pox, infantile paralysis, measles, whooping cough, and hog cholera.

Bacteria vary in size, averaging about 1/25,000 of an inch in diameter. Such extreme minuteness can be realized from a few comparisons. About 400,000,000 could be packed into a grain of sugar. Eight billion can be crowded into a mass the size of a pinhead. Thirty-seven thousand typhoid bacteria placed end to end would just about span the length of a common kitchen match.

In regard to form, bacteria fall into three general groups. Some are spherical, like minute berries, and never more than a diameter in length. They are known as *cocci,* from the Greek word for berry. A second group include those which are

[1] Most of these facts are summarized from Conn, H. W. and H. J., *Bacteriology,* Williams and Wilkins Company, Baltimore, 1923.

rod-shaped, and are known as *bacilli,* from the Latin for stick or staff. The third group are elongated, comma-shaped, and if several of them remain attached in a chain, the chain becomes a spiral. These are known as *spirilla,* from the Greek for coil.

Bacteria multiply by division. This process, known as fission, is the simplest possible method of reproduction. It merely requires a cell to lengthen and then to divide transversely into two individuals. When one learns that under favorable circumstances this may happen as often as once in twenty minutes or less, its possibilities by way of increase become apparent. The simple application of arithmetic will show that a single germ may produce at this rate a billion descendants in ten hours. In the case of the germ that causes Asiatic cholera mature generations of bacteria succeed one another at fifteen-minute intervals. At this rate the progeny in twenty-four hours would be twenty-five hundred billion times the number of seconds in a billion years.

For each microörganism there is some one temperature at which the most rapid growth is possible. This is called the optimum temperature for growth. For the majority of bacteria it lies between 25° and 30° Centigrade, or 75° to 85° Fahrenheit. Some, however, have an optimum temperature considerably out of this range. There are bacteria that grow best only a little above the freezing point. As a general rule, low temperatures do not kill bacteria readily. Cultures have been submitted to the temperature of liquid air without being killed. The typhoid bacillus, for instance, survives the freezing point without much difficulty. On the other hand, most bacteria are killed rather promptly when exposed to the temperature of boiling water, yet one of the strange adaptations of bacteria to environmental conditions is found in a group known as the heat-loving germs, found in hot springs and occasionally in the alimentary canal of man and animals. The bacteria which are disease-producing for man develop best at the body temperature, 98.5° Fahrenheit.

Bacteria require certain chemical elements for growth. The most important of these are carbon, nitrogen, and oxygen.

Of lesser importance are sodium, potassium, phosphorus, and, to some extent, iron and sulphur. No bacterial growth is possible unless these elements are present in available form; but sometimes very minute quantities will suffice. It has been shown, for instance, that some bacteria are able to grow upon the inconceivably small amounts of impurities found in distilled water.

Bacteria, like all other forms of life, are poisoned by certain chemicals. In general these chemicals are poisons to all forms of life, but certain of them are peculiarly bacterial poisons. This is important because it is desirable often to kill bacteria without danger to human beings. To this property is due the popularity of such germicides as chlorinated lime, hydrogen peroxide, boric acid, salicylic acid and sodium benzoate, which may be used as disinfectants where an ordinary poison would not be safe.

Bacteria are found everywhere. They are always floating about in the air, but in relatively small numbers compared with those in the soil, market milk, or water. Soil contains millions of bacteria per gram. Milk that has become sour may contain billions per cubic centimeter. There are some in every glass of water we drink and on nearly every mouthful of food we eat. They are found in every tiny speck of dirt or dust. Millions of them are in the mouth, in the intestines, and on the skin in every part of the body. Thus it is easy to understand why they manage always to find their way into any substance that furnishes favorable conditions for their growth.

KINDS OF BACTERIA AND THEIR FUNCTIONS

Fortunately, most bacteria are harmless from the standpoint of producing disease. The great majority of them, when inoculated into living tissues, are unable to gain a foothold, soon cease to grow, and die. If, however, these same organisms are inoculated into the same tissue after the animal has died, they begin to feed upon it, multiply, and produce decomposition. This class of organisms which can thus attack organic matter after death but cannot exist in the presence of living tissues are known as sarophytes.

The rôle played in nature by the sarophytes is a very useful and a very important one. Numerous common phenomena result from their activities. The souring of milk, the ripening of cheese, certain of the fermentations resulting in the formation of various acids, the spoiling of wine, the disintegrations incidental to the manufacture of hemp products, the old method of making indigo, the natural and artificial methods for the destruction of the organic waste in polluted waters and sewage, are all well-known illustrations. Similarly, in the elimination of dead bodies of plants and animals in woods and fields and in various chemical changes connected with the maintenance of the fertility of the soil, bacteria are of inestimable importance in the cycles of natural forces which make possible life upon the earth. Were it not for the activity of these microscopic living creatures all life upon the surface of the earth would cease. Deprive higher vegetation of the carbon and nitrogen supplied to it as a result of bacterial activity, and its development comes rapidly to an end; rob the animal kingdom of the foodstuffs supplied to it by the vegetable world, and life is no longer possible.

While not of immediate importance in this connection, it is well to remember that the problems of bacteria and microorganisms involve not simply the narrow topic of human and animal disease, important as that may be, but many phases of nature's life processes. They lie at the foundation of agriculture, and their partial solution has produced already revolutions in the dairy and other businesses. It is coming to be realized that they apply to many social problems and to many economic pursuits.

Of the more than 1,500 kinds of bacteria which have been described during the last half century, apparently less than fifty have acquired in the course of evolution the ability to thrive in the living bodies of animals and plants, and at their expense. Such bacteria are known as parasites, from the Greek word applied to the hanger-on at a great man's house, and it is perhaps pertinent to remember that the habit of parasitical living is not limited to the microbic world. Clearly it is the parasitic class of microörganisms alone that are

capable of producing disease, for infectious diseases, as we now know, are produced always by the growth and multiplication of microörganisms alone within the living body of plants and animals.

There is a curious fact about these parasites which suggests the law of compensation even in the microscopic world. In exchange for their ability to grow in living hosts, they lose the power of living a free and independent life apart from the host. In becoming adapted to the parasitic life, there is lost the ability to live and grow in water or earth or decomposing matter or in any of the other environments in which the harmless bacteria can thrive. Even the typhoid organism, which is found frequently in water is incapable of living a non-parasitic life for more than a comparatively few days unless cultivated under special laboratory conditions.

"This is a point of the first importance in connection with the spread and control of communicable diseases. A parasitic microbe capable of growing in the human body can thrive only in the human body (or in certain instances in the body of some other animal). It may and often does survive for a time in water or soil or filth, but only for a time. Disease bacteria when outside the human body are almost always dying out, and as a rule are dying out with great rapidity. There are exceptions to this, as to all rules. In milk, for example, certain disease germs find a culture medium in which they may grow and increase. In water, in earth, in dust and air, however, the parasitic microbes quickly perish.

"Let us take water as an example: Sir Alexander Houston, the bacteriologist of the London Water Board, put some typhoid germs into a bottle of water. There were 470,000 of them in one cubic centimeter (a small thimbleful) of water at the beginning of the experiment. Then he merely let the bottle of water stand in his laboratory. At the end of one week there were 480 bacteria per cubic centimeter; at the end of two weeks, there were 31; at the end of three weeks, 5; and at the end of four weeks all were dead." [1]

[1] WINSLOW, p. 11.

THE CONTROL OF DISEASE

Changed Attitude Toward Disease.—The gradual accumulation of facts concerning these parasitic invaders has led to a new and clearer understanding of the nature of disease. Having learned that infectious diseases are produced by microscopic plants and animals, we have come to study these, to learn their life histories, to perceive their methods of distribution from person to person, and finally to take measures to prevent their spread or to fight them in the body of the sick animal or person.

The movement inaugurated by the chemist Pasteur has revolutionized not only the function of medicine but our whole attitude toward disease. The doctor with his pill for every ill gives way to the research student in bacteriology and chemistry, and they in turn join hands with the social and community worker in the removal of conditions fostering disease. Death and sickness are no longer conceived of as occurring through divine displeasure and at a constant rate. The earlier fatalism which regarded human mortality as following an inexorable law is passing. Preventable death and preventable disease are stock phrases today for recognized wastes, all the more lamentable because so unnecessary. Man is learning that, as Pasteur put it, "it is within the power of man to rid himself of every parasitic disease." A world-wide war has been declared upon disease.

The results have been amazing. Historic plagues, formerly devastating entire continents, have been or are in process of being eliminated. Epidemics which used to run riot periodically through communities are being brought under control. Diseases current for centuries today afflict individuals only in scattered instances. The processes of control are growing alike in effectiveness and in inclusiveness. Illustrations of these statements will appear in subsequent pages.

The Decline of the Death Rate.—The vital statistics of the different nations of Western civilization tell, during the last fifty years, one of the most sensational stories in the history of man. It is the story of the control of life itself.

In the last half century the death rate in Massachusetts, the first state in this country to have vital statistics of any value, has declined more than one-fourth; in the two decades for which statistics are available, that of the United States (registration area) declined more than a third. During the quarter of a century from 1881-5 to 1906-10, the death rates of Finland, Norway, Sweden, and Scotland declined about one-fifth; of Austria, Belgium, Denmark, England and Wales, Hungary, Italy, Spain, and Switzerland, about one-fourth; of Australia, Bulgaria, Holland, and the dozen chief cities of the world, a third and more.

A simple problem in arithmetic will serve to indicate the enormous saving of life which these facts involve. In 1900 the death rate in the registration area of the United States was 17.8; in 1920 it was 11.6, a decrease of more than 6 deaths per thousand population. For a population of 100,000,000 people, this means that 620,000 fewer people died in the United States in 1920 than would have if the rate of 1900 had still prevailed. In all the life of our race, extending over more than a thousand centuries, perhaps, the like of this has never been known.

The death rates over a number of years for certain cities and countries will be found in the tables on pages 168 and 169.

An examination of these tables shows that the general death rate has fallen during recent decades and that the decline is common to all civilized countries. When it is remembered that there has been some progress in all countries during these years in the completeness with which deaths are reported, such decline is even more striking. It is necessary, however, to add a word of caution and explanation with reference to the declining death rate. The reduction has been due largely to a decrease of deaths from communicable diseases, and it has been especially marked in connection with the death rate among children. There has been little reduction on the whole among the non-infectious diseases, and the effects upon the adult community have been less than upon childhood. In the United States, particularly, the improvement is limited to the early-age groups; after the age of fifty there is

TABLE I

DEATH RATES, ALL CAUSES, REGISTRATION AREA, UNITED STATES 1900–23

Years	Deaths per 1000
1900	17.6
1901	16.5
1902	15.9
1903	16.0
1904	16.5
1905	16.0
1906	15.7
1907	16.0
1908	14.8
1909	14.4
1910	15.0
1911	14.2
1912	13.9
1913	14.1
1914	13.6
1915	13.6
1916	14.0
1917	14.2
1918	18.1
1919	12.9
1920	13.1
1921	11.6
1922	11.8
1923	12.3

TABLE II

DEATH RATES, CERTAIN LARGE CITIES, BY FIVE-YEAR PERIODS AND IN 1920

Years	New York	Chicago	Philadelphia	Boston	Baltimore
1901–05	19.0	14.5	18.1	18.8	20.0
1906–10	16.9	14.9	17.7	17.9	19.5
1911-15	14.4	14.6	15.9	16.4	18.1
1920	13.0	12.8	14.4	15.4	15.4

TABLE III

DEATH RATES, ENGLAND AND WALES, BY FIVE-YEAR PERIODS

1861–65	22.6
1866–70	22.4
1871–75	22.0
1876–80	20.8
1881–85	19.4
1886–90	18.9
1891–95	18.7
1896–00	17.7
1901–05	16.0
1906–10	14.7
1911–15	14.3
1916–20	14.5

TABLE IV

COMPARATIVE SUMMARY: DEATH RATES, VARIOUS COUNTRIES, BY FIVE-YEAR PERIODS. 1881–1920

Country	1920 –16	1915 –11	1910 –06	1905 –01	1900 –96	1895 –91	1890 –86	1885 –81
Australian Commonwealth	10.8	10.7	10.7	11.7	12.7	13.3	14.8	15.7
Denmark	13.1	12.8	13.7	14.8	16.4	18.6	18.7	18.4
England and Wales	14.5	14.3	14.7	16.0	17.7	18.7	18.9	19.4
Finland	19.5	16.1	17.4	18.6	19.0	20.5	20.0	22.2
France	20.2	19.3	19.2	19.6	20.7	22.3	22.0	22.2
Germany	19.0	17.7	17.5	19.9	21.2	23.3	24.4	25.3
Ireland	16.6	16.8	17.3	17.6	18.1	18.5	17.9	18.0
Italy	21.8	19.3	21.0	21.9	22.9	25.5	27.2	27.3
Netherlands	13.7	12.8	14.3	16.0	17.2	19.6	20.5	21.4
New Zealand	10.7	9.2	9.7	9.9	9.6	10.1	9.0	10.9
Spain	24.6	22.1	24.3	26.0	28.8	30.1	30.9	32.6
Sweden	14.6	14.0	14.3	15.5	16.1	16.6	16.4	17.5
Switzerland	14.9	14.3	16.0	17.5	18.1	19.8	20.4	21.3

little evidence of improvement and some evidence of an increasing mortality, although there is much divergence of opinion on this matter. This question will be discussed more fully in a subsequent chapter.

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CHAPTER IX

INFECTION, RESISTANCE, AND IMMUNITY

The researches of Pasteur and his contemporaries revealed the true nature of disease, and their work constitutes the foundation upon which has been built in the last generation the science of public health. Some of the more simple yet fundamental facts involved were outlined in the preceding chapter. An additional and highly important part of the story which modern bacteriology has established remains to be told. This includes the phenomena of microbic infection, man's susceptibility and resistance to infection, and the balances between man and microbe which prevent the overwhelming of the human race by its bacterial foes. "The intricate, reciprocal relations which exist between man and microbe bring into sharp relief a biological struggle between a host and an invader, of such amazing complexity that its solution will require a knowledge of the fundamentals of life itself. Nevertheless, considerable progress has been made and many facts have been established. The master minds of each generation are working toward its solution. The conquest of the disease-producing microbe is slowly advancing. The final exposition must await the perfection of knowledge in the fields of chemistry, physics, and physiology." [1]

An effort will be made in this chapter to summarize briefly our knowledge with reference to these three questions: (1) How do microörganisms produce disease? (2) How does man resist disease? and (3) On the basis of our knowledge of these processes, what has man learned to do to protect himself?

I. HOW MICROÖRGANISMS PRODUCE DISEASE

This question has been raised since the earliest days of bacteriology, and various tentative answers have been given.

[1] Kendall, Arthur I., *Civilization and the Microbe*, Houghton Mifflin Company, Boston and New York, 1923, pp. 195-196.

Many phases of the relationship are still obscure, but it is apparent that in most cases bacteria affect the body in one of the following ways.

1. *By the destruction of body cells or tissues.* This is best illustrated in the case of boils or abscesses. Here the microörganisms actually destroy or disintegrate the body cells or tissues. The entire mass becomes partially softened and decomposed—necrotic, as the pathologists say—and eventually forms that gruesome mass known as pus. Another instance may be found in the case of gas bacilli, very prominent in wound infections during the war, which destroyed muscle tissue so rapidly.

2. *Through the formation of toxins.* In the case of certain diseases the actual injury is caused by poisonous substances which the parasitic invaders produce and which act upon the host in such a way as to injure some of its bodily functions. These poisonous substances are called toxins. They are formed inside of the bacterial cells, but are soluble and are freely excreted from the cells so that they may pass into the surrounding area. They may be destructive locally, destroying the surrounding tissues, or they may be absorbed by the blood circulating through that area and carried to various parts of the body, producing symptoms of irritation and destruction. An illustration of such widespread effects is found in the case of diphtheria, in which, besides the local effect—the well-known sore throat—there are symptoms all over the body. Less often, as in the case of lockjaw, the toxins are absorbed by the nerves rather than by the blood.

3. The injurious effects of most pathogenic bacteria are due to another toxic product—*the poisonous split-proteins.* When bacteria are killed and disintegrated, their cell substance is broken down as any protein substance (milk, egg, meat) might be broken or split into smaller particles in ordinary digestion. In this splitting process certain substances are set free. Much still remains to be learned about these substances, but it is known that they are very poisonous in nature. When set free, they are carried everywhere by the circulating blood. Some of them irritate one set of tissues, some another.

Thus when typhoid bacteria are disintegrated, one set of symptoms appear, while another set characterize tubercular infections.

In comparing split-proteins with toxins, the following points of difference appear. True toxins are formed by living cells, poisonous split-proteins only on the death and disintegration of bacteria; true toxins are produced by but a few species of bacteria, but split-proteins may be obtained on the decomposition of any kind of bacteria or, apparently, of any protein substance. Again, true toxins are soluble and are found, therefore, in the filtrate of bacterial cultures; poisonous split-proteins are liberated only on the destruction of the cells themselves. Other differences exist, but these will be touched upon later.

To this process of invasion of the body by germs, and the production within the body by the germs of substances which are either poisons or capable of being changed into poisons, the term *infection* is applied. An exact and detailed understanding of the nature of infection, and of different infective diseases, is very important, since both the symptoms which appear and the methods that have to be adopted for combating them vary in accordance with the differences in details of the general process.

II. HOW WE RESIST DISEASE

It is evident that the body of a living animal has some power to resist the invasion of microscopic organisms. Attention has been called to the fact that most bacteria cannot grow in living tissue. Furthermore, certain individuals or entire groups are immune from a particular disease. By the term immunity is meant the power possessed by an organism of resisting the invasion of a microscopic parasite. The opposite condition to immunity is designated as susceptibility, both conditions bearing witness to the existence of, and the difference in, the resistance of individual bodies to disease-producing microörganisms.

Types of Immunity.—It is an interesting contrast of facts which the student of immunity finds. "Man is quite free from the epizoötic diseases of the animals he has domesticated;

also, it is well established that animals do not contract the contagious diseases of mankind. Thus, fowl do not sicken with Asiatic cholera nor do men acquire fowl cholera. Typhoid fever and whooping-cough are unknown among the animal species, and hog cholera and Texas fever of cattle are not recorded in the list of human diseases. It is true that a very few diseases of animals, as, for example, Malta fever (of goats), rabies, bovine tuberculosis, and glanders, may be transmissible from animal to man. It should be observed, however, that these infections are not, as a rule, retransmissible from one man to another man. In other words, they are not contagious among mankind.

"Closely related animal species manifest a puzzling difference in susceptibility to one and the same microbe. Algerian sheep, so the claim is made, may be pastured with impunity on farms so thoroughly infected with anthrax bacilli as to be deadly for the common breeds of sheep. Field mice are said not to succumb readily to the glanders bacillus, a deadly infectant of house mice.

"Again, many individuals among an otherwise susceptible race exhibit striking resistance to specific infection. Thus, certain members of a family may escape that highly contagious disease, scarlet fever, even though brothers and sisters fall victims of this dread malady. Many members of a community escape typhoid fever, even though the virus be generally disseminated through a contaminated water supply. A very small number of cases of meningitis or of infantile paralysis appear in a community where the majority, the great majority, of people escape. On the contrary, a world-wide epidemic—a pandemic—of la grippe, or 'flu,' claims its thousands of victims in the exposed community." [1]

Racial Immunity.—It appears, then, that microörganisms which produce disease in one species of animals are quite unable frequently to attack another, that diseases which ravage one race of men are powerless to affect seriously, if at all, another branch of the human family. When the members of a race or species are observed to resist infection by a specific

[1] KENDALL, *op. cit.*, pp. 196-197.

germ, we speak of the phenomenon as race immunity. Race immunity is perfectly well established, and is one of the prominent factors in public health work. The negro, for example, is to a degree immune from malaria, a disease that is extremely common among the white population. On the other hand, he is more subject to smallpox, tuberculosis, and pneumonia. The Jap is virtually immune from scarlet fever.

Individual Immunity.—If some, but by no means all, of a species, race, or group exhibit refractoriness to infection by a specific microbe—and there is considerable variation in this respect as a matter of fact—such members are spoken of as possessing individual immunity. Thus, as has been pointed out, it is not uncommon to find a family in which one child escapes a disease that has attacked every other member, or, *vice versa*, one child alone will contract a disease to which all its brothers and sisters have been equally exposed. Such differences cannot always be due to accident. Plainly there must be considerable difference in the susceptibility of different individuals in the same species to the same disease.

Natural and Acquired Immunity.—Immunity differs in kind as well as in extent. Some individuals are immune from certain diseases from birth; others acquire immunity sometime later in life. The former we speak of as natural immunity, and is thought of as an inherited quality.; in the latter case the term acquired immunity is used. Acquired immunity plays an important part in the control of infectious diseases. "It has long been known that after an attack from an infectious disease a person is likely to be more or less thoroughly protected for some time against a second attack of the same disease, even though he may be repeatedly exposed to infection. As a rule, people do not have such diseases as smallpox, scarlet fever, measles, and so forth, a second time. The completeness of such immunity varies greatly with different diseases and different individuals. With some diseases it is almost absolute, while with others it is slight; with some it may last for years or even for life, while with others it may pass off in a few months." [1]

[1] Conn *and* Conn, revised edition, *op. cit.*, p. 262.

The Mechanism of Defense.—Since the earliest days of medical practice, the cure of disease has been accomplished by the natural powers of the body. As one bacteriologist has put it, we never really cure any disease; we only help the body to overcome it. This, with several exceptions, is true. In cases where nature's defense and the attacking forces of infection approach equality, the physician's influence may be, and often is, the decisive factor. By the use of drugs he may reduce fever, relieve pain, correct intestinal disorders, and stimulate activity in some organisms, or by means of serums, as will be explained later, add to the protective forces which the body itself produces. But, in a large measure, we have to depend upon nature—*i.e.,* the body—to accomplish the cure.

How does the body protect itself? What forces produce recovery after infection? What causes immunity? Why should an individual, after recovery, be protected against further attack by the same microbe? Why should he not be immune from attack by other microbes? What are the details of nature's defensive mechanism? Questions like these have been raised almost from the beginning of the study of the germ theory of disease. Complete answers cannot yet be given, but many important facts have been established in the last generation which have yielded very practical results. Researches into this field were stimulated for several decades by the intense rivalry of the French and German schools, the former working on a biological, the latter on a chemical, theory of explanation. It is evident now that both were correct, that the real facts embrace a combination of the two theories, that it is a dual system of defense which nature has devised.

The First Line of Defense.—In the circulating blood, which nourishes every organ and tissue of the body, there are hundreds of wandering, independent cells, known as white blood corpuscles, or leucocytes. There are approximately 7,500 leucocytes per drop of blood. These leucocytes have the power of taking up and digesting microörganisms or apparently any irritative, invading substance. They are "the armed patrol

which the body maintains to insure freedom of the blood channels from predatory microbes. The white blood-cells are police, judge, jury, and jail, all in one. They arrest, engulf, digest, and destroy the criminal germs. If microbic outlaws enter the blood stream, these leucocytes march upon and annihilate them. If the germs enter the tissues, the white blood-cells swarm after them and congregate around the alien horde in ever-increasing number. The felonious host is gradually surrounded, engulfed, and destroyed. The field of combat becomes strewn with the dead and dying corpses of microbes and leucocytes alike. . . . Sometimes the outlaw germs prevail and cause widespread destruction in the body, or even death. Occasionally the microbes settle down in a joint or the heart, and keep up a languid opposition to the efforts of the body to dislodge them. Usually, however, the leucocytes prevail and restore order." [1]

For the salient facts of the leucocyte defense of the body against microscopic invasion we are indebted to a Russian scientist, Metchnikoff. He began his work in this field about 1880, and during his later years was connected with the Pasteur Institute in France. The theory woven out of the facts which he and his disciples gathered is known as the Cellular or Phagocytic (scavenger cell) theory of Immunity.

The Second Line of Defense.—If the microscopic invaders overcome the first line of defense, they multiply rapidly and infection develops. A new phase of the struggle now begins. The body mobilizes latent defensive weapons and starts a definite campaign against the invader. There is today no question but that the recovery from an infectious disease commonly takes place as the result of the development within the body of certain protective substances produced by the activity of the living tissues. These protecting substances are called *antibodies.* They are not definite bodies like white corpuscles; they cannot be seen with the microscope; we know nothing of their chemical composition. They can only be demonstrated by the effect which they produce. We do know that they are found in the liquid part of the blood and lymph, that they are

[1] KENDALL, *op. cit.*, pp. 202-203.

powerful aids in overcoming disease, and that there are many different kinds.

Kinds of Antibodies.—It has been shown that the effects of microörganisms producing disease are due mainly to two causes: first, to the toxins which they form; second, to the poisons formed when the invaders are disintegrated in the body. It is to be expected, therefore, that *antibodies,* in their reaction to disease, should group themselves under two main heads: first, those that neutralize the toxins; second, those that destroy bacteria themselves.

The Antitoxins.—Antitoxins are a very important class of *antibodies.* They do not affect the bacteria directly, but simply neutralize the toxins which the bacteria make; hence the term antitoxins.

In some diseases, toxins are excreted very rapidly and, being absorbed by the body, marked disturbances promptly result. For example, in the case of diphtheria the microörganisms are located usually in small patches in the throat, but the toxins produced are absorbed by the blood and distributed to all parts of the body. The result is a general irritation and disturbance of many parts of the system—headache, backache, nausea, fever, as well as sore throat. If a person is to recover from diphtheria, not only must the diphtheria germs be killed, but the poisons (toxins) they formed must be neutralized or rendered ineffective. Hence, antitoxins are highly important protective agents against a disease like diphtheria, as is true also in the case of lockjaw and gas gangrene. It might be added that this power of living tissue of producing antitoxins is a very broad one and is effective not only against bacterial poisons, but also against all other soluble toxins as well.

Bacteria-destroying Antibodies.—The second general kind of *antibodies* are those which act upon the bacteria themselves. They are very different in their action and very different in practical value from the antitoxins, for while the latter have been found very useful in curing disease, the former are of great value in preventing disease. Since the destruction of disease-producing bacteria involves more or less irritation due to their split-protein disintegration products, it is essential

that the bacteria be destroyed as promptly as possible. Manifestly, the more prompt such body reactions, the fewer bacteria there are to be destroyed, and the less split-proteins are set free in the body.

The bacteria-destroying *antibodies* vary in their way of attack. Some kill the bacteria directly, others help the white corpuscles to destroy them.

Antibodies which dissolve or destroy bacteria directly are known as lysins. Their existence in normal blood was demonstrated by Nuttall and has been known since 1886. We cannot attribute their source to any special gland or tissue, but it is known that they are formed, not only against bacteria, but against other foreign cells, and that they are specific, whether formed against bacteria or against other types of cells. Because of their specific character, they lend themselves to the diagnosis of disease, tests upon their presence now being used for several diseases.

The rate at which white corpuscles take in and destroy bacteria seems to turn very largely on the presence and aid given by certain kinds of *antibodies*. Among the *antibodies* which help the body to resist disease by aiding the leucocytes are those known as agglutinins. These have the property of causing bacteria to "clump" or agglutinate in masses, thus making it easier for them to be caught and engulfed by the white corpuscles. Although their presence in the blood or serum of immune animals has been known for thirty years, and agglutination tests have been used in the diagnosis of disease, especially typhoid, it is only in recent years that we have had complete evidence that agglutination is an important preparatory step in the destruction of and in the elimination of bacteria from the body. Agglutinins, too, are specific in their function. This is one of the oldest known facts about them. It is this specificity which makes it possible to diagnose disease by testing for them. This has been done in the case of cholera, typhoid, paratyphoid, dysentery, pneumonia, meningitis, and glanders. Of these, the typhoid test is the most common in this country.

Other *antibodies* aiding the white corpuscles are known as

opsonins. The term is derived from the Greek opsonium, meaning a relish, and the term indicates very well their particular function. Opsonins apparently act as a sort of sauce, making bacteria more attractive and digestible to the leucocytes. "More is heard about the opsonins in connection with tuberculosis than in any other disease. It was at one time hoped that we could tell the patient's condition and progress by determining from time to time the number of bacteria taken up by white corpuscles when his serum was added, measuring the opsonic power of his blood serum. But it is so difficult to measure accurately the amount of opsonin present that little is now attempted along this line. It is important to realize, however, that this does not mean that the opsonins are thought to be unimportant aids. On the contrary, the phagocytic action of the white corpuscles depends upon these antisubstances." [1]

The impression must not be gathered from anything that has been said that any one of these antisubstances works singly or exclusively in any disease. In most cases, more than one reaction occurs, though one apparently is always much more prominent than the rest. "In diphtheria, for example, there is a lysin formed which helps kill off the bacteria, but it is so much less important than the other *antibodies,* including antitoxin, that the blood of animals immune to diphtheria may fail to show any lysin at all when tested for lysin. The relative importance of the lysins in diphtheria is also shown by the fact that in experimental animals inoculated with living diphtheria organisms, there may be recovered from the scabs at the site of the injection live diphtheria bacteria after the animals have become immune from diphtheria; bacterial lysins, therefore, cannot be the most important factor in diphtheria immunity. In discussing any particular disease, it is, therefore, common to emphasize one reaction—antitoxins, for example, in diphtheria. That means only that this is apparently the most important of the reactions, or the one most

[1] Broadhurst, Jean, *Home and Community Hygiene,* J. B. Lippincott Company, Philadelphia, 1920, p. 196.

readily measured or determined, and does not necessarily imply that it is the only reaction made against the disease." [1]

Mention is made of the matter of relative importance because a very heated argument in the history of bacteriology was waged over this point. "Metchnikoff, working on tuberculosis, where phagocytosis is the most important protective factor, claimed that recovery from disease was due to the action of white corpuscles. Behring, working on diphtheria, claimed that recovery was due to the action of the antitoxin. Each worker cerified his own findings, Metchinkoff for tuberculosis, and Behring for diphtheria, and presented still stronger arguments for his own side. If each had worked with the other's material, he would have seen at once that the other was also right. It was another case of the two knights and the two sides of the shield." [2]

HOW MAN APPLIES THIS KNOWLEDGE

An understanding of the processes of infection and resistance suggested almost at once the possibility of attacking disease by helping individuals too slow in forming the necessary protective substances. Progress in this direction in the last forty years has been highly satisfactory, particularly in the production of artificial immunity, so that today nearly all of the infectious diseases of domestic animals and many of the human diseases are being mastered. The remainder of this chapter will be devoted to a brief summary of the several methods of protecting individuals against disease which have been utilized with success.

1. *The Method of Direct Attack.*—This involves the use of drugs or chemical agents which kill the bacteria. We are somewhat limited, however, in the means we can employ in this way, for while there are a number of chemical agents which can be used to kill bacteria, there are not many which can be used in sufficient strength without destroying the surrounding tissue, or irritating them so that they do not heal

[1] Broadhurst, Jean, *How We Resist Disease,* J. B. Lippincott Company, Philadelphia, 1923, pp. 49-50.

[2] Broadhurst, *Home and Community Hygiene,* p. 199.

properly. The ordinary germicide is so poisonous that any attempt to use it within the body would be fatal to the host as well as the bacteria. It was Ehrlich who conceived the idea of obtaining a germicide so modified and combined with other chemicals that it could be used in the body effectively for a specific purpose. Six hundred and five of his attempts at such a combination failed, but on the next trial he produced salvarsan, a combination of arsenic and benzol, for use in the treatment of syphilis. Thus was born a new branch and theory of medicine, known as Chemotherapy. When, at the close of the first decade of the twentieth century, Ehrlich published the results of his investigations, they fell like a bombshell among the medical fraternity, and there was considerable opposition and ridicule, principally from those who feared the dominance of the profession by the chemist, and from such interests as were allied to the manufacture of certain medical products.

In addition to syphilis, quinin may be used in treating human malaria, as it kills all forms of the malaria organism; and several other drugs have been used effectively by way of direct attack. It is to be noted that "most of the diseases in which drugs are used effectively are caused by protozoa. Bacteria are apparently much more resistant to most drugs than our own body tissues are. Good results have been claimed in human anthrax through the same arsenic-benzol compound that is used in treating syphilis, and bacteria-infected wounds are undeniably treated advantageously with such drugs as the modified hypochlorites used in the Carrel-Dakin method, or ordinary wound disinfectants. Nevertheless, in the body itself, chemical treatment against bacteria is not yet satisfactorily established. Amounts too small to kill bacteria may affect the body tissues—ultimately, if not directly. The treatment of syphilis affords an illustration of such indirect interference in the effect on the teeth following the continued use of mercury." [1]

2. The second possibility is that of *giving the individual antisubstances formed in the body of another animal.* This brings us to the subject of antitoxins.

[1] Broadhurst, *How We Resist Disease,* p. 67.

It has been pointed out that certain diseases result from the toxins formed by bacteria. These bacterial toxins have a common possession in their power to stimulate the production of *antibodies* which have a neutralizing effect upon the toxins but which do not destroy the bacteria themselves. It was discovered early that toxins, being soluble, are found in the broth in which the bacteria are grown. This broth being filtered, the soluble toxin (but not the bacteria) will be found in the filtrate. If this toxin-containing filtrate is used for inoculation, the person or animal reacts, forming neutralizing *antibodies* just as if the bacteria had not been filtered out. The *antibodies* thus formed are known as antitoxins.

The next discovery came when it was learned that such toxins, while fatal if injected into an animal in sufficient quantity, when used in smaller quantities caused sickness with subsequent recovery. The importance of this principle was recognized immediately, but its practical application demanded the production of the antitoxin on an adequate scale. This difficulty was solved in 1894 by Roux in the case of diphtheria.

"The method by which diphtheria antitoxin is produced today is essentially the same as the method devised by Emile Roux, and is briefly as follows: Diphtheria bacteria are cultivated in a broth in which they grow rapidly, and after a few days the broth is found to be filled with a considerable quantity of diphtheria toxin, the substance which poisons a child and produces the symptoms of the disease when the bacteria are growing in the child's throat. This toxin is next injected in small quantities into the body of a horse, certain definite intervals being allowed to elapse between the injections. The first injection has no noticeable effect on the horse, but it renders him capable of standing a second injection of a larger amount, and this protects the animal from a still larger amount at a third injection. These injections of toxins are kept up for a number of weeks until experience has shown the maximum result to be obtained. During this period a large quantity of antitoxin has been produced in the horse's blood. At intervals thereafter some of the horse's blood is removed,

allowed to clot, and the serum which separates from the clot is used to fight diphtheria in man."[1]

Diphtheria antitoxin has been referred to at length, not as the only, but perhaps as the most interesting, example, and certainly as the most widely known and the first application of the principle involved to be placed on an unchallenged basis. Its discovery was one of the epoch-making discoveries of medicine, and its development has resulted in a tremendous saving of life. Not many years ago diphtheria was the black enemy of childhood, three-fourths of its victims being under six years of age. In pre-antitoxin days, the mortality from this disease was from 70 to 75 per cent. This has been reduced to about 10 per cent, the present proportion being due to delayed diagnosis or treatment or both.

Antitoxins, however, are effective only after diphtheria develops. In recent years, medical science has found it possible to go a step farther. Dr. Shick, of Vienna, has shown that it can be determined by a skin test whether or not an individual is susceptible to diphtheria—*i.e.*, whether he has antitoxin in his blood which will protect him in case of attack by that disease. This test is made by injecting a tiny amount of diphtheria toxin beneath the outer layer of the skin of the forearm. If there is no antitoxin present to neutralize the effects of the toxin, the tissues about the place injected will show irritation in the formation of a red, inflamed area, which appears in from twelve to forty-eight hours, is at its height for three or four days, and lasts from one to two weeks. But if the individual is immune from diphtheria, the antitoxin present in the blood will neutralize the toxin injected and the symptoms just described will not appear.

Some interesting data resulting from the application of the Shick test have appeared. Recent reports show that large numbers of school children in Eastern cities, ranging from 30 to 80 per cent, are susceptible to diphtheria. It is interesting to note that the percentage is highest in the lowest age groups, and that as the age increases, the percentage of persons immune increases. Another curious fact which appears is

[1] Conn *and* Conn, *op. cit.*, p. 62.

that children in the poor and crowded areas of New York City show a high rate of immunity, while those in the more select schools and from higher income homes show a high rate of susceptibility. This probably means that the children of the former group develop, as a result of constant and repeated exposures, a natural immunity.

The next step taken involved the effort to make an individual develop his own antitoxin, rather than to inject it from the horse, and to do so before infection occurred; in other words, to produce an artificial immunity. It was recalled that in making antitoxin there was injected into the horse not only toxin, but also a little antitoxin so as to neutralize the toxin injected. This was applied to human beings, with entirely satisfactory results. Accordingly, if the Shick test reveals susceptibility to diphtheria, we now proceed to inject into the child some toxin-antitoxin, which results in the formation of the necessary *antibodies* over against the time when they may be necessary for the protection of that child. The immunity develops in from three to twelve weeks, and is quite lasting. Experiments in New York show the immunity thus established to persist five years and more, so that now there is every reason to believe that diphtheria will soon be eradicated as completely as smallpox.

3. The third possibility that has been utilized thus far is *the stimulation of the body to form its own antisubstances more abundantly.* There are several ways in which this principle has been given practical application, but these methods are all alike in that they use disease organisms which are greatly weakened or killed before they are injected into the human body.

The earliest use of weakened organisms to prevent disease was in connection with smallpox. Two hundred years ago, less than ten people in every hundred escaped smallpox, and over 10 per cent of all deaths were caused by it. The majority of persons appear to have been pockmarked, the faces of royalty being no exception. "A pox upon you," was a common curse of the times. An English health officer of this period

quaintly and correctly classified the citizens of his town by saying that so many had had smallpox, so many were at the moment having smallpox, and so many (the rest of the population) were still to have smallpox.

In 1718, Lady Mary Montagu, wife of the British ambassador to Turkey, introduced into England, after trial in her own family, a method she found in practice in Turkey. Pus from an eruption on a "light case" was inoculated into the blood of a person who had not had smallpox, with the supposition, sometimes realized and sometimes not, that the inoculated person would have a similarly light attack. This practice was adopted quite generally in England, and in the New World as well. Mrs. Alice Morse Earle, in her delightful study of *Customs and Fashions in Old New England,* gives an interesting account of this development in the Colonies. It appears that smallpox hospitals came into existence, to which whole families and parties resorted to pass through the ordeal in concert. These smallpox parties were made the occasion of much friendly intercourse; they were called classes.

"These classes were real country outings, having an additional zest of novelty since one could fully participate in the pleasures, profits, and pains of a smallpox party but once in a lifetime. Much etiquette and deference was shown over these 'physical gatherings,' formal invitations were sometimes sent to join the function at a private home. Here is an extract from a letter written July 8, 1775, by Joseph Barrell, a Boston merchant, to Colonel Wentworth: 'Mr. Storer has invited Mrs. Martin to take the smallpox in her house; if Mrs. Wentworth desires to get rid of her fears in the same way we will accommodate her in the best way we can. I've several friends that I've invited, and none of them will be more welcome than Mrs. Wentworth.' These brave classes took their various purifying and sudorific medicines in cheerful concert, were 'grafted' together, 'broke out' together, were feverish together, sweat together, scaled off together, and convalesced together. Not a very prepossessing conjoining medium would inoculation appear to have been, but many a pretty and sentimental

love affair sprang up between mutually 'pock-fretten' New Englanders."[1]

A much safer and more effective method of protection against smallpox was destined to develop, however. In the last decade of the eighteenth century, Dr. Edward Jenner, noticing the smooth skins and pure complexions of the milkmaids in the north of England, became interested in the superstition of dairy folk that people who had had cowpox did not take smallpox. Jenner, aided by one Jesty, a farmer, began making experiments to check up the accuracy of this belief. Jesty inoculated his wife and two children with cowpox, successfully. Jenner then inoculated with smallpox pus ten people who had had cowpox. Not one contracted smallpox, although many years had passed since several of the subjects had had cowpox. Jenner added one more experiment. He inoculated a boy with pus from a dairymaid who, through a cut in her hand, had contracted cowpox from a cow she milked. The cow pus "took"; twice afterward the boy was inoculated with smallpox pus, but he was immune. The material taken from the cow was called vaccine (*vacca,* a cow), and the process was termed vaccination. During the years 1799-1901 over 3,000 different persons were thus vaccinated, and then inoculated, at the London Smallpox Hospital, with the demonstration of complete protection in every case. There is perhaps no procedure in medicine which rests upon so ample and sure a basis of direct experimental evidence.

Vaccination has meant, or makes possible, the elimination of smallpox. As soon as its practice was introduced in the various countries of Europe, the terrible death rates of preceding centuries began to fall. In Sweden, the death rate for the twenty-eight years before vaccination was 2,050 per million, and for the forty years following vaccination, 158 per million. As late as 1893-7, the smallpox rate was over 90 per million in incompletely vaccinated countries like France, Belgium, and Austria, rising to 463 in Russia and 563 in Spain. In well-vaccinated countries like Germany and the Scandinavian countries, the rate has been one or less for the last half century.

[1] Earle, *op. cit.,* pp. 352-353.

During the eight years before the American army entered Havana, and before vaccination was enforced, there were 3,132 deaths from smallpox in the city; during the next eight years there were 7. In 1905 and 1906 over three million vaccinations were performed in the Philippine Islands with the result that a toll of 40,000 deaths a year was changed to a few hundreds, the latter occurring in remote places which had not been reached with fresh and potent vaccine. In the provinces immediately adjacent to Manila there were 6,000 deaths a year from smallpox before vaccination, and none after. When the health service of the Philippines was turned over to native officials in 1914, vaccination came to be neglected, and as soon as enough susceptible children had been added to the population, the disease broke out once more. In 1918 there were again 50,000 deaths from smallpox in the Philippines, nine-tenths of them among the unvaccinated children.[1]

Despite all this evidence, there are misguided individuals in this country who would persuade us that vaccination is dangerous and useless. Several times, due to their aggressive propaganda in certain states in the West and South, compulsory vaccination has come very near to being voted out of existence. It is not wise to dismiss such propaganda as the work of dyspeptic men who get their ideas of health from reading breakfast food advertisements, and of certain types of aggressive females. Unless its menace be appreciated and combated, certain sections of the United States are headed for an experience like that in the Philippines. In 1916 there were 15,450 cases of smallpox in the United States, with 48 deaths; in 1920 there were 94,691 cases, with 366 deaths. It is not unlikely that we shall have some striking demonstration of the folly of neglect of vaccination in the next decade or two, which will be all the more pitiful because so obviously unnecessary.

Organisms that cause disease may be weakened in other ways than by growing them in less susceptible animals. If bacteria are cultivated in the presence of weak chemicals, sub-

[1] Summarized from WINSLOW, *op. cit.*, p. 56.

jected to too high or too low a temperature, dried, or simply allowed to grow old, they may become similarly attenuated.

It was Pasteur who first developed a method of weakening or attenuating organisms by laboratory procedure so that they might be used as vaccines. In 1880, while working on fowl cholera, it happened, quite by accident, that some hens were inoculated by an old culture of fowl-cholera organisms made a few weeks before, instead of a fresh culture but a day old. The hens sickened, but, contrary to Pasteur's previous experiences, they recovered. Later, when these same hens were inoculated with fresh cultures, they proved to be immune. Pasteur at once interpreted this to mean that the hens survived because they had been sufficiently irritated by the weakened organisms to produce antisubstances sufficient to give full protection against the fresh and vigorous organisms used in the second inoculation. In other words, it was essentially the same situation as when cowpox organisms were used, except that the fowl-cholera organisms had been weakened by age instead of by being grown in a less susceptible animal. Pasteur and his associates next experimented in the production of weakened organisms with other laboratory conditions and were entirely successful.

The best known contribution of this kind was made in connection with rabies. In this case the organisms were weakened by drying. Although the organisms were not isolated, they were weakened by drying the brain and spinal cord of rabid animals, as it was found that these tissues contained the organisms. With such dried tissues, Pasteur showed that by gradually using organisms that were less and less weakened, he could protect dogs from rabies if they were later bitten by rabid animals or inoculated by him with saliva or brain tissue containing rabies organisms. He also demonstrated the possibility of protecting dogs even if they were bitten or inoculated before he began treatment with the weakened organisms. The reason for this is that rabies organisms develop very slowly, and before the few organisms entering when the dog is bitten can multiply sufficiently to produce rabies, the dog forms

sufficient protecting *antibodies* against the numerous weakened organisms given in the series of inoculations.

This method is today commonly used to protect people who have been bitten by rabid animals. It was first tried by Pasteur in 1885 on an apparently hopeless case, a little boy terribly bitten. Although the child was not brought to Pasteur until two and a half days after being bitten, Pasteur accepted the challenge and began his inoculations with organisms which had been dried for fourteen days. The successful outcome of this and another apparently hopeless case brought Pasteur international fame and firmly established the use of attenuated organisms as vaccines. Today, our larger cities have Pasteur Institutes, or similar divisions of health departments, for the purpose of developing immunity to rabies by the use of weakened organisms.[1]

In certain diseases, like typhoid, it would be very unwise to inject live bacteria, even if weakened, into a person, because they continue to live and multiply in the intestinal tract after the person has recovered. Such a person might then become a carrier of the disease. Fortunately, it has been found, again quite accidentally, that in certain diseases dead organisms are sufficient. This appears to be true when the effects are due to the disintegrating proteins of the bacterial cells.

The preparations of dead bacteria are known as the bacterial vaccines. Of these, the best known is the typhoid vaccine. A known amount of killed typhoid bacteria is injected into the flesh, usually about one or two c.c., containing from 500,000,000 to 2,000,000,000 bacteria. Absorbed by the blood, this substance stimulates the formation of *antibodies,* as would the live typhoid germs entering the body. Usually three such injections are given, at intervals of a few days, to make sure that the individual forms enough antisubstances. Recently in the United States army a special glycerin combination of three disease organisms (typhoid, paratyphoid, and dysentery) has been given all in one injection, with excellent results. By the application of this vaccine treatment the typhoid rate in the United States army was reduced to one-tenth of its former

[1] Broadhurst, *How We Resist Disease,* pp. 171-173.

figure between 1909 and 1914; and the freedom of the armies from this disease during the World War was due chiefly to the use of this preventive.

"There has hardly been any discovery in the history of medicine as reliable and efficient as this anti-typhoid vaccination. It was at first thought that immediately after vaccination a person was somewhat more susceptible to the disease for a few days; hence at the outset the advice was given not to use anti-typhoid vaccination if a person was believed to have been exposed to the disease. Further study, however, has shown that this is not the case, and at the present time persons are very commonly thus vaccinated when they think they have been exposed and wish to be protected from the disease. One can hardly conceive of a more surprising discovery than that an efficient method of protecting a person from the attack of an invading parasite is to fill his blood with millions of the dead bodies of this parasite. But strange as the method is, its success is beyond question, and while it was somewhat doubted when first introduced, it is now one of the universally acknowledged methods of protection against typhoid fever." [1]

The Present Status of Vaccines.—Protective inoculation against disease has been applied to mankind thus far only in emergencies or for certain types of serious diseases which are widely distributed. The following list contains the instances where the principle has been applied for the protection of mankind:

1. Vaccination against smallpox.
2. Use of antitoxin against diphtheria.
3. Use of toxin-antitoxin in immunizing against diphtheria.
4. Use of antitoxin against tetanus.
5. Use of antivenin as a cure for the bite of poisonous snakes.
6. A spinal meningitis serum which has been fairly successful.
7. Protective inoculation against rabies.
8. Bacterial vaccines against blood poisoning, typhoid, whooping-cough, bubonic plague, pneumonia, with varying success.
9. Certain types of dysentery, cured by special serum from the horse.
10. Asiatic cholera has been treated by weakened cultures, and also by bacterial vaccines.
11. Carbuncles, abscesses, and boils have been treated successfully with bacterial vaccines.

[1] CONN *and* CONN, *op. cit.*, p. 282.

In summary, it may be said that the prophylactic vaccines —in preventing disease—are on a more unchallenged basis than can be claimed for the curative vaccines. In our own country, smallpox, typhoid, and rabies vaccines rank first, with diphtheria vaccine rapidly establishing its value. There is some considerable diversity of opinion with regard to the value of vaccines used in preventing or in treating infections of the respiratory tract, such as whooping-cough, pneumonia, influenza, and colds. This may be explained partially by the fact that many different organisms are usually present in the areas affected by each of these diseases. Persistent congestion of such areas as the frontal sinuses may resist vaccine treatment because such areas are too poorly supplied with blood to be greatly benefited by ordinary amounts of the antisubstances formed against the vaccine. Recently Calmette has reported successful preventive work with tuberculosis vaccine, with both cattle and monkeys.

The rate of progress depends upon the financial and moral support given to the investigators who are constantly placing new weapons into our hands and to the public health administrators who are actually directing the use of these weapons. As we come to realize the grim reality of the warfare against disease, appreciate the hundreds of thousands of lives lost annually, and the cost of such loss of life, to the extent that we shall attack disease with the same vigor which we would display against any other such dangerous foe, to that extent we shall progress toward the day foreseen by Pasteur in which the shadow of microbic disease shall be lifted from the lives of men.

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CHAPTER X

THE COMMUNICABLE DISEASES

The Science of Epidemiology.—The study of the causes of disease, with particular reference to its manner of spread and its prevention, is known as Epidemiology. The term is derived from two Greek words, *epi,* meaning upon, and *demos,* the people.

In the scientific study of disease, the clinical observer was the first to make his appearance. He was interested primarily in the sick patient, and he recorded the facts concerning the symptoms of the disease. Later came the bacteriologist and the pathologist, the former devoting himself to the germ which caused the disease, how it lived and reproduced itself; the latter, with the effects of the germ on the tissues of the body. "The epidemiologist took the information furnished from all three types of observers, and from these data tried to establish how the disease spread and how it could be checked. His primary interest lay in establishing the modes of transmission, or the chain of infection by which germs traveled from the sick to the well; and in seeking the links in this chain which could be broken by quarantine, disinfection, or such other means then at his disposal, with the purpose of preventing the spread of the disease." [1] It is to be remembered that even though we do not know the organism which causes a disease, we may control that disease if we know how it is spread.

Although restricted at first to the study of epidemics, the field of epidemiology has broadened out gradually so as to include the study of all diseases as they affect groups or masses of people. "The epidemiologist in practice today is quite as much interested in increased prevalence of pellagra or beriberi as he was formerly in typhoid or diphtheria." [2]

[1] McLaughlin, *op. cit.,* p. 12.
[2] *Ibid.,* p. 11.

Some Terms Defined.—The term communicable will be applied hereafter to all those diseases which are caused by microörganisms—bacteria, protozoa, and viruses—and which are transmitted from one person to another under suitable circumstances. This includes, then, all those diseases which formerly were referred to as either contagious or infectious. The distinctions implied by these older terms were rather artificial, were a source of much confusion and useless discussion, and served no useful purpose. The word communicable is much simpler, ignores the particular mode or modes of transference, and includes the increasing number of diseases which are known to be insect-borne.

Epidemic, endemic, and pandemic are three terms used frequently in discussions of the communicable diseases. A disease which spreads rapidly and affects a large number of people in a community in a short time is said to be epidemic. For purposes of maritime quarantine, a disease is considered epidemic if there is more than one focus of infection; that is, if several cases occur which have no apparent connection with one another. A disease is spoken of as being endemic when it is peculiar to a particular district, locality, or class of persons. In other words, a disease which smolders is said to be endemic, and epidemic if it bursts into flames. Pandemic means that a disease is epidemic more or less everywhere; that is, that a large number of people in a number of different countries are affected at the same time.

In order to facilitate their study, the communicable diseases are classified usually into five distinct groups: (a) those derived from animals, (b) the insect-borne diseases, (c) those spread by discharges of the mouth and nose, (d) those spread by intestinal and urinary discharges, and (e) the direct-contact diseases. Each of these groups, with the exception of the last named,[1] will be considered in this and the succeeding chapter, with discussions of one or more particular diseases in each group.

[1] The most important of the direct-contact group are the venereal diseases, which are omitted somewhat arbitrarily because they are to constitute an important part in another volume under construction by the author.

DISEASES DERIVED FROM ANIMALS

The chief source of disease germs is man himself, but there are a few diseases in whose spread animals play an important role. One such disease is rabies, to which all animals are susceptible, but which is most common in dogs. Man usually contracts the disease by being bitten by a dog with rabies, although it should be kept in mind that infection may result from any rabid animal licking the hands or face, provided there is a break in the skin.

Another disease in which an animal plays a causative role is tuberculosis. This dread disease is caused by the tubercle bacillus, of which there are at least four varieties—human, bovine, avian, and piscidian. The latter two, found among fowls and fishes, are not pathogenic for man and may be disregarded here. The significance of bovine tuberculosis for man will be discussed in the chapter on tuberculosis, but it may be said here that the bovine type is pathogenic for man, but less so than the human bacillus. Infection in man from the bovine source occurs usually in childhood, through unpasteurized milk.

Anthrax, one of the most serious and fatal diseases known among cattle, is transmitted occasionally to man. "Human anthrax is usually caused by handling hides, wool, hair, or other animal products. If the infection enters through the skin, a malignant pustule is produced. If the infection is inhaled with dust, the 'wool-sorters' ' disease, a pneumonia-like disease, results. There is also an intestinal infection due to insufficiently cooked meat. Recently a considerable number of cases have occurred in the United States, caused by infected shaving brushes, made from horsehair." [1]

Other diseases which may be due to infection from animal sources are glanders, Malta fever, and trichinosis.

THE INSECT-BORNE DISEASES

A second group of communicable diseases are those which are borne by insects. The insect may be an agent in the

[1] McLaughlin, *op. cit.*, p. 239.

spread of disease in one of two ways. In some diseases, the parasite undergoes reproductive changes in the insect-carrier; in others, the insect simply picks up the infective agent from one person and carries it to another. The former is designated as biological, the latter as mechanical transmission.

The increasing number of diseases which in the past twenty years have been shown to be transmitted by insects is one of the most significant developments in the field of preventive medicine. "Mosquitoes are responsible for the transmission of malaria, yellow fever, dengue, and filariasis. Ticks carry Rocky Mountain spotted fever, relapsing fever of West Africa, and Texas cattle fever. Bedbugs carry European relapsing fever, and Indian kala azar. Lice transmit typhus fever and some forms of relapsing fever. Fleas are responsible for the transmission of plague. Biting flies transmit small eel-like parasites, called trypanosomes, which cause sleeping sickness and various animal diseases. Flies and other insects can carry mechanically the germs of many diseases, typhoid, cholera, eye diseases, smallpox, and others." [1]

Before the role played by insects was understood, man was rather mystified by the widespread extent of these diseases. Plainly they were not spread by contact, yet they abounded in certain localities. All sorts of theories developed, involving miasms, night air, and what not. Now that their mode of transfer has been learned, they have become relatively easy for man to control—when he shows a willingness so to do. The story of several of the more important insect-carriers and insect-borne diseases will serve to indicate some of the concrete problems involved.

THE FILTHY FLY

In certain diseases, such as typhoid, the germ invades the system through the intestinal tract and leaves it in the intestinal discharges or urine. The ordinary house fly breeds by preference in horse manure, but will lay its eggs in almost any kind of moist decaying organic matter. In view of these two facts, it can be seen readily that the fly is a factor in the

[1] McLaughlin, *op. cit.*, p. 46.

transmission of such diseases as typhoid and dysentery, and of somewhat more importance as a factor in rural than in sewered urban districts.

Most of the evidence incriminating the fly is in connection with typhoid fever. It has been shown, for instance, that cases of typhoid and the number of flies fall and rise together; in fact, that the annual fall increase in typhoid occurs at the time when flies are most common. During the Spanish-American War, typhoid became excessively frequent in the American camps, one in five of our volunteer soldiers suffering from it. The Typhoid Commission which studied the matter gave special attention to the role played by the fly, and concluded that about 15 per cent of the cases were due to this mode of transmission. Alice Hamilton isolated typhoid bacilli from five out of eighteen house flies captured in Chicago in the privy and on a fence near a sick room during a local water-borne epidemic. In Jacksonville, Florida, a campaign for rendering outside closets fly-proof throughout the city reduced the typhoid death rate from 106 to 26 per 100,000 population.

Apparent as all this may be today, it took several centuries to catch up with the conclusions of Kircher, who, as early as 1658, definitely mentioned flies as transfer agents, saying that "there is no doubt that flies feed on the internal secretions of the diseased and dying; then flying away, they deposit their excretions on the food in neighboring dwellings, and persons who eat it are thus affected." [1]

Quite a vigorous campaign against the fly has been waged in recent years. Unfortunately, the effort, in part at least, has been misdirected. "Swatting the fly," while an excellent-sounding slogan, does very little good. Flies breed so rapidly that it is hardly possible to diminish their number by destroying adults. It is true that in the cities, where the swatters have been most active, flies are fewer in number than formerly but the real reason is the replacement of the horse by the automobile, rather than the swatters. The real solution to the problem of the fly as a menace to health lies in the systematic

[1] Quoted from Broadhurst, *Home and Community Hygiene*, p. 169.

and rigorous control of sanitary conditions which make continued fly-breeding possible, that is, the elimination of decaying organic matter, and particularly of stable manure.

MALARIA AND THE MOSQUITO

The most important of the insect-borne diseases undoubtedly is malaria. By reason of the sickness, inefficiency, and mortality resulting from it, one is inclined to agree with Sir William Osler that it is "the greatest single destroyer of the human race." Dr. Carter, of the United States Public Health Service, has this to say about the seriousness of malaria as a problem:

"The hot countries are pre-eminently the home of protozoal infections, and in the southern parts of the United States one such disease, malaria, stands foremost for the injury it does. In that section not one of the bacterial diseases is in its class in this respect, not even excepting tuberculosis. And here, let me say, that in making this statement I am only considering such parts of the South (and Southwest) in which malaria prevails to such an extent as to create a serious sanitary problem. In many sections of the South it is no problem at all; in many others it is a very minor problem; but in those sections where it is really prevalent the question of malaria easily constitutes the most important sanitary problem with which we have to deal. There it stands first on the list for the injury which it does the community.

"The recorded mortality of a disease frequently does not indicate its true influence on the death rate. This is eminently true of malaria. From its effects, physical and economic, in lowering the general vitality of a community, it is a causal factor in many a death in which it is not the terminal factor, the one recorded as the 'cause of death.' Mortality statistics do not, then, give the proper weight of this disease as a cause of death.

"It is not in its death rate that the gravest injury of malaria lies; it is in its sickness rate, in the loss of efficiency it causes, rather than in the loss of life. One death from pneumonia ordinarily corresponds to about 125 sick days—work days

lost; one from typhoid to 450 to 500 sick days; one from tuberculosis to somewhat more than this among whites, decidedly less among negroes. A death from malaria, however, corresponds to from 2,000 to 4,000 sick days. This loss of efficiency may really be doubled or trebled, for the man infected with malaria is frequently half sick all the time.

"And it is the amount of malaria when it is bad which appalls. If 1 per cent of the population is stricken with typhoid fever, it is an epidemic, and a bad one. Contrast this with 40 per cent to 60 per cent of a population per annum affected with malaria (and I have seen outbreaks with 90 per cent), and you gain some idea of the importance of this disease. The loss of efficiency caused by malaria in the malarious section of the South is beyond comparison greater than that caused by any other disease, or even by any two or three diseases combined, including typhoid fever and tuberculosis." [1] In short, it may be said that where malaria prevails, and almost in direct proportion to its prevalence, the population is generally subnormal physically, mentally, and economically.

Malaria is one of the longest known of the human diseases. Its zone is almost coincident with the tropics and the larger portion of the temperate zones; it has been, consequently, a danger and a menace to man since early times. Modern scholarship assigns an important, if not the leading, role to this disease in the decay of certain earlier civilizations. It is a significant fact that the decline of ancient Greece followed quickly upon the heels of the development of malaria in epidemic proportions among her people, as did also that of Rome. While there certainly were other factors which contributed to the downfall of these civilizations, the effects upon the classical world of the devitalizing results of this disease are clear and pronounced.[2]

Two characteristics peculiar, although not exclusively so, to malaria accentuate its menace. One of these is the relative, and perhaps absolute, impossibility of acquiring immunity from it. The inhabitants of the malarious parts of southern

[1] Quoted from McLaughlin, *op. cit.*, pp. 197-198.

[2] Cf. Binder, *Health and Social Progress*, Chaps. VI-IX, for a summary of the evidence on this point.

Europe have inherited no marked immunity from malaria by virtue of the thousands of years during which their ancestors lived in those districts. Even among the negroes in Africa very few individuals are absolutely immune, and such freedom from the disease is not hereditary. As a matter of fact, a person who once has had malaria seems more apt to have subsequent attacks. Practically all people who receive the infection for the first time are susceptible.

The other characteristic has been alluded to already by Carter. Malaria is not spectacular. If today an epidemic of plague, typhoid, typhus, or leprosy were to break out in any part of the country, the press, the pulpit, the people, and the health authorities would awaken promptly to vigorous action. But malaria is a quiet, unspectacular, undramatic, insidious disease. It is associated seldom with death. It arouses little public interest. Yet there are few diseases which do such consummate and extensive injury.

What makes the continued cost of malaria through the centuries all the more appalling is the fact that its existence is so unnecessary, as revealed by our recently gained knowledge of its cause. In 1880, Laveran, a French army surgeon, identified the malaria parasite. Eighteen years later, as the result of the work of numerous investigators, it was demonstrated that a certain kind of mosquito, of the genus *Anopheles,* is responsible for the distribution of malaria, and apparently solely responsible.

The connection of the disease with marshy areas, which had been appreciated for centuries but historically attributed to the poisonous night air in these regions, now becomes clear when it is recalled that mosquitoes breed only in stagnant water. Effective control, too, becomes now a simple matter. "The change from man to the mosquito and back again is necessary for the continued existence of the parasites, just as necessary as that change for the germ of wheat by which it is alternately in the ground and in the air. The malaria parasite cannot live indefinitely in the mosquito; it can live much longer, though not indefinitely, in man. Without this continued change between the two hosts the parasite dies. This,

then, gives us our clues for malaria control: (1) Keep infected mosquitoes away from man, and (2) keep mosquitoes away from infected men. The control of either host—the mosquito or the man—will eliminate malaria." [1]

Both approaches to the problem have their respective supporters and have been utilized with success. Immediate relief is gained by the measures directed against the infection in man. One such measure is screening—to keep *Anopheles* mosquitoes from man, and much can be done in isolated farmhouses and plantations by this method. It is less feasible in villages and thickly settled communities. The other measure directed against man involves the use of quinin. Malaria is one of the few diseases for which medicine has furnished a specific cure. Quinin does not prevent infection, but only destroys the parasites in the blood during the period of incubation. As it cannot always be timed exactly right, frequent repetitions of the dose are necessary.

"The systematic use of quinin as a prophylactic on a large scale is of recent origin. The government of Italy in 1902 began the sale of quinin at cost price to communities and towns, which agreed to distribute it gratuitously to those unable to purchase it. In 1903 the towns, etc., were obligated to issue it free of cost to poor people for prophylactic use. The next year, 1904, it was ordered to be given to all workingpeople for use in this way. This is a beneficent public health measure comparable to the free distribution of antitoxin and vaccine virus. There has been a great diminution in the amount of malaria among the farming people of Italy since the introduction of the quinin prophylaxis; furthermore, the reduction has been progressive—increasing as the people learn its value." [2]

Other extensive experiments with its use have been made by the Japanese in Formosa, the Germans in East Africa, and the Americans in the Panama Canal Zone. It is especially valuable when screening is not possible, as in camping, marching, traveling, and night occupations, or when residents of

[1] Carter, quoted from McLaughlin, *op. cit.*, p. 201.

[2] Rosenau, M. J., *Preventive Medicine and Hygiene,* fourth edition, D. Appleton & Company, New York City, 1924, pp. 292-293.

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non-malarial countries go into malarial districts. It is cheap, effective, and satisfactory, even if somewhat temporary.

The elimination of the *Anopheles* mosquito is, however, without question the real remedy. If its breeding were stopped, malaria would cease. The most effective way of doing this is to drain the marshes and to remove all the small accumulations of stagnant water, for these insects will not breed in large open ponds or clear flowing streams. The underdraining of large areas of our arable land in the Middle West with tile drain has been most effective in suppressing malaria. Open ditches are likewise effective. Another excellent way of destroying the breeding places of the malaria mosquito is to clear the land and keep it under cultivation. Large open spaces cause the wholesale destruction of mosquitoes, as they cannot live long in the hot sun.

When drainage is unduly costly, the wigglers may be destroyed by spraying oil on the marsh lands, since the oil spreads in a thin layer over the surface and makes it impossible for the insects to get to the air to breathe. Or, ponds, streams, pools, etc., may be stocked with fish which eat them. Bats are natural enemies of mosquitoes and should be protected. Whenever and wherever measures such as these have been directed energetically against the mosquito and the conditions which breed it, malaria has diminished and even disappeared. Few other discoveries have led so quickly to such beneficial results.

Several Southern communities have witnessed in recent years some striking illustrations of the possibility of malarial control. During the World War, some of the camps were located in the most malarious sections of the South. Due to the mosquito-destruction measures taken by the United States Public Health Service in its work of protecting the health of the military forces in the extra-cantonment areas, the sick rate from malaria was negligible. The obvious success of these measures awakened the entire South to the possibilities of control and ultimate elimination of malaria.

Another series of demonstrations of the value of malaria control measures in various Southern states and in tropical

countries have been carried on by the International Health Board, and these too have shown that by the control of mosquito-breeding areas, by screening, or by the systematic use of quinin, it is possible to eliminate from four-fifths to nine-tenths of the malaria in the worst infected districts, and at a cost amounting to less than a dollar per inhabitant a year.

The economy of malaria control thus becomes obvious, and this fact is penetrating slowly into the consciousness of afflicted communities. The annual loss resulting from this disease in the United States amounts to hundreds of millions of dollars, and it is apparent, in view of the relatively low cost of an effective campaign against it, that it will prove decidedly worth while, from a purely economic standpoint, to lift this burden from the shoulders of our Southern people.

THE CONQUEST OF YELLOW FEVER

Another insect-borne disease, of considerable importance historically, is yellow fever. It is found primarily in the New World, and has been confined to a large extent to the tropical part thereof. People of the present generation know little of its ravages, but since the days of the ancient Maya civilization it has been the curse of tropical America. From the tropics it was carried to other regions during the summer months. Before it was known how yellow fever was conveyed and before effective quarantine was instituted, it was a serious menace to all cities in direct communication through the trade routes with the tropical countries.

Yellow fever kills about one-fourth of those attacked. In 1793, one-tenth of the people of Philadelphia died during an epidemic of it. Another epidemic of appalling proportions struck the Southern states in 1878. People fled by the thousands, and the money cost was estimated at more than a $100,000,000, not to mention the loss by death. Without exaggeration, it may be said that the French effort to build a canal across the Isthmus of Panama was brought to naught by yellow fever.

One of the places where yellow fever was prevalent for many

years was Havana, Cuba. The disease was carried there in the eighteenth century by European sailing-vessels and became epidemic after 1762. During the nineteenth century the deaths from it there frequently ran as high as 1,500 per annum, or 428 per 100,000. Accordingly, in 1898, when the American army entered Cuba, yellow fever was one of the major problems with which it was confronted. Fortunately, American medical men rose to the occasion, and their conquest of yellow fever involves one of the most dramatic episodes in the history of public health.

In 1900 a commission of American army surgeons was sent to Cuba. It will be remembered that the mosquito theory of malaria transmission had just been established, and the members of the commission turned naturally to tests for a similar explanation for yellow fever. What followed is told in a most excellent manner by Winslow in the following words:

"The lower animals were not known to suffer from yellow fever, so that experiments upon human subjects were essential. In the words of Dr. Kelly's life of Major Reed, 'after careful consideration, the Commission reached the conclusion that the results, if positive, would be of sufficient service to humanity to justify the procedure, provided, of course, that each individual subjected to experiment was fully informed of the risks he ran and gave his free consent. The members of the Commission, however, agreed that it was their duty to run the risk involved themselves, before submitting anyone else to it.'

"The first successful experiment was made with Dr. Carroll, who allowed himself to be bitten on August 27 by a mosquito which had previously bitten four yellow fever patients. Four days later he was taken sick and for three days his life hung in the balance. Both he and Private W. H. Dean, the second case produced experimentally in the same way, recovered. Dr. Lazear, however, who came down with the disease, not as a result of the experimental inoculations to which he also had submitted, but from an accidental bite, was less fortunate than his colleagues, for a week later he died, after several days of delirium.

"An experimental station, named Camp Lazear after this first martyred member of the party, was established in the open country, and, to the lasting honor of the United States army, volunteer subjects for the experiments were always in excess of the demand. Private John R. Kissinger and John J. Moran, a civilian, were the first to volunteer 'solely in the interest of humanity and the cause of science,' their only stipulation being that they should receive no pecuniary reward.

"The result of the experiments carried out at Camp Lazear proved beyond preadventure that yellow fever was transmitted by the bite of a certain mosquito, *Aëdes calopus,* and in no other way, for non-immunes who lived for twenty days in a small ill-ventilated room, in which was piled clothing and bedding, loathsome with the discharges of yellow fever patients, all escaped infection so long as they were protected from the bites of mosquitoes. . . .

"The practical result of this discovery was immediate and striking. In the half-century or so for which we have records, yellow fever had killed an average of 750 persons a year in the city of Havana. The sanitary reforms introduced by the American army of occupation which produced good results in reducing typhoid and smallpox had been powerless against yellow fever because its cause was as yet a mystery. Following immediately on the experiments at Camp Lazear, on February 15, 1901, a campaign was begun on the new lines indicated, by screening the rooms occupied by yellow fever patients and destroying all mosquitoes in the neighborhood. As a result there were 6 deaths in the city of Havana during the year 1901 as against 305 in the preceding year, and although sporadic cases have been introduced from other localities, yellow fever has never again established itself in Havana. The scourge of centuries was wiped out in a single year.

"It was the demonstration of yellow fever control at Havana which, four years later, made possible the building of the Panama Canal and throughout the Torrid Zone has opened up the tropics for the occupancy of the white race. During the last few years the International Health Board has actively

embarked upon the aggressive warfare of extermination against yellow fever outlined by the late General Gorgas. At Guayaquil, once the chief endemic center of this disease, it has been eradicated. During 1921 Honduras, Nicaragua, Ecuador, and Costa Rica were immune from the disease; Guatemala and Salvador had no cases later than February; by July, Peru, and by November, British Honduras, were free from infection. The complete eradication of yellow fever from the earth is within the bounds of our vision." [1]

Recently Noguchi has proposed the use of an anti-yellow fever vaccine, prepared from cultures of *Leptospira icteroides* for the specific control of the disease and an antiserum for its treatment. The value of these remains to be ascertained.

SLEEPING SICKNESS

This dread disease, although definitely recognized since about 1712, has come to be known to the American people within only recent years. It takes its name from one of its symptoms. In the later stages of the disease the patient passes into a condition of lethargy, from which he cannot be awakened and which finally ends in death. Persons recovering from it manifest most distressing effects, and its existence is an alarming phenomenon for any people.

Sleeping sickness (*Encephalitis lethargica, nona*) is distinctly an African disease. Tropical West Africa, Uganda, Rhodesia, Portuguese East Africa, and recently tropical Brazil have all suffered severely from it, some districts in Africa having been virtually depopulated by its ravages in the last several decades. In the United States, between September, 1918, and May, 1919, the disease was observed in twenty-one states. In 1919, there was an extensive outbreak in Canada. The age group forty to fifty-nine years shows the highest incidence, and it is apparently more prevalent among males than among females.[2]

The study of sleeping sickness has been largely in the hands

[1] Winslow, C.-E. A., *The Evolution and Significance of the Modern Public Health Campaign*, Yale University Press, New Haven, 1923, pp. 41-43.

[2] Fitzgerald, J. G., *The Practice of Preventive Medicine*, C. V. Mosby Company, St. Louis, 1922, p. 125.

of the English, because it has been most common in those parts of Africa which belong to the British. It is now known to be a protozoan disease, caused by a blood parasite, and transmitted to man through the bite of the tsetse fly.

The prevention of the disease, in its several varieties, necessitates apparently the adoption of various methods for the control or extermination of the insect carrier. Much success has attended efforts directed to this end in places where they can be carried out successfully. There is also a recent German discovery, known as "Bayer 205," which promises control of the disease. Although its composition still is a secret, it is known to be a synthetic drug similar to the one used in the treatment of syphilis.

TYPHUS FEVER AND THE LOUSE

Typhus fever, differentiated from typhoid by W. W. Gerhard, of Philadelphia, in 1836, is one of the great epidemic diseases. It is preëminently a disease of filth. Typhus epidemics of the past have occurred almost without exception where there has been overcrowding in unsanitary quarters. It has been called jail fever, ship fever, and camp fever, because it has been generally in those places that the fostering conditions have been most prevalent. Especially has it hung like a black cloud over armies during the centuries. It decimated the troops of Napoleon in the retreat from Moscow; it was epidemic during the Crimean War; the armies in the Russo-Turkish War of 1878 suffered seriously from it; and in the Balkan Wars it attained epidemic proportions in Serbia, where, in one year (1915), 150,000 died from it. There have been outbreaks in civilian populations, too, such as the epidemic of 1846 in Ireland, those of the 'seventies in Berlin and Vienna, that of 1883 in Philadelphia, and of 1892-3 in New York. In recent years, with increasing habits of personal cleanliness, it is gradually disappearing, being confined to places where community hygiene and sanitation are inadequate.

In 1909, Nicole, in Tunis, succeeded in transmitting the disease by the body louse. This discovery was confirmed

quickly, and it explains why typhus occurs so generally among persons living in overcrowded, filthy, unhygienic surroundings. The discovery of its transmission by lice, and apparently by lice alone, made it clear that a simple routine of cleansing bodies and clothing could be relied upon to check its ravages. By so doing, through the use of delousing stations, kerosene shampoos, steam sterilization, and dry heating, the disease was kept under control during the World War. Unfortunately, with the breakdown of civilization in Russia after the revolution, it broke out once more on a large scale, and by 1921 the possibility of an invasion of typhus from that country was considerably more of a menace than any Bolshevik doctrine. Fortunately, in Poland, where the principal battle line was set, the Polish Sanitary Commission, aided by the Epidemic Commission of the League of Nations, through the establishment of quarantine stations and disinfecting plants, checked successfully its westward spread.

Typhus emphasizes, perhaps more than any other disease, that, in a very fundamental sense, sanitation and health are social and economic problems. As the economic conditions of the masses have improved, as their circumstances of life have afforded the opportunity to keep clean, this filth disease has decreased and disappeared. Lodging-houses, cheap boarding-houses, night shelters, hospitals, jails, and prisons are important factors in the spread of this disease. They should receive rigid sanitary supervision.

RATS, FLEAS, AND THE PLAGUE

The plague has a long and tragic history. It has run its devastating course through the centuries from China to Asia and Egypt, to Europe, and recently to the Western Hemisphere. It is stated that about half of the people of Rome died of it about the year A.D. 500, and when, in the fourteenth century, it swept over Europe, approximately 25,000,000 people, or about one-fourth of the population of the entire continent, were taken. This was the epidemic known in history as the Black Death. In 1665 another epidemic of the plague

broke out in London. Its horrors have been immortalized by Defoe in his *Journal of the Plague Year.* All business ceased in the city; its inhabitants fled in the wildest panic. More than 70,000 out of a population of 200,000 died in one season, and it was not until the following year that a conflagration burned a considerable part of London and cleaned out the disease. In 1871 it again broke out in China and eastern Siberia, whence it passed to India, where it claimed 6,000,000 victims within a decade. In 1893 it broke out anew in Hong-Kong, and the following year is said to have caused more than 100,000 deaths in Canton. From Hong-Kong and Canton, it spread to India, Egypt, Japan, the Philippines, and ultimately to ports all over the world. In 1899 plague broke out in Brazil, and these were the first cases to be reported on the Western Hemisphere. Since that time cases of plague have occurred in Mexico, Central America, and California, chiefly in and about San Francisco. In 1914 an outbreak took place in New Orleans, and again in 1919. The following year the disease appeared for the first time in Galveston, Texas, Beaumont, Texas, and Pensacola, Florida. In 1924 there was an outbreak in Los Angeles.

The bacteria causing the plague, *Bacterium pestis,* was identified in 1894. Apparently there are at least two strains, attacking the body in two different ways. In some cases it attacks the glands, especially those around the groin, causing them to swell, producing what are known as buboes. Hence the name bubonic plague. In other cases it attacks the lungs, producing a rapidly fatal disease. This is the pneumonic plague. It is really a pneumonia, due to the plague bacillus.

The distinction between these two forms is important, with reference both to geographical distribution and to the manner of transmission. Pneumonic plague is partial to colder climates. Its worst recorded outbreak occurred in Manchuria, a very cold country, above latitude 50°. Bubonic plague has shown no tendency to spread north of latitude 40° except in the Mediterranean and our own Pacific coast, where the climate is milder than that of countries farther south in other

parts of the world. The transmission of the pneumonic form appears to be like that of other forms of pneumonia. It is violently contagious. The material coughed from the mouth or blown from the nose of the infected patient is found to contain virulent organisms, and it is thought that other persons inhaling these organisms acquire the disease in this form.

The source of bubonic plague is the rat or some other rodent. In America the Californian ground squirrel became infected and the disease still exists among them. They are not migratory, however, are rural in habitat, and hence do not come into close contact with people. The rat, on the other hand, is a great traveler, is urban in habitat, and lives in close association with people. It is therefore far more dangerous in this connection than the ground squirrel.

While the rat is the chief source of bubonic plague, the flea is its carrier. Fleas infected by biting an infected rat leave the rat when he dies and seek another, feeding on other rats or man or any warm-blooded animal they encounter. It is now believed that bubonic plague is spread from rat to rat, and from rat to squirrel and man, by the flea, and in no other way. Cases of bubonic plague in man are harmless in an environment free from fleas and vermin.

With the information now at hand, there is no need to fear the wide extension of bubonic plague where there is an efficient health control. The disease is spread from one country to another by infected rats carried in ships. In countries where the disease is not now present, maritime or other quarantine is the effective method of preventing the disease from acquiring a foothold.

The successful eradication of plague in the United States has been achieved several times by the Public Health Service, by measures directed against the rat. The most difficult task has been in California. When bubonic plague made its first appearance in San Francisco, its presence was kept a secret, apparently because it was felt that if its appearance became known, business in the city would suffer serious loss. As a result the disease spread rapidly, until its existence could be

concealed no longer. Finally an extensive campaign was undertaken to exterminate the rats. Meanwhile, however, the disease had spread beyond San Francisco, with the infection of the ground squirrel, thus making the task much more difficult.

CHAPTER XI

THE COMMUNICABLE DISEASES—*Continued*

The overwhelming majority of the communicable diseases in the temperate climates, where the insect-borne diseases are practically non-existent, belong to two main groups. In the first group are those diseases in which the germs are given off by the sick persons in the discharges from the intestines or kidneys, or both. Such diseases are typhoid, paratyphoid, dysentery, Asiatic cholera, infantile diarrhea, and hookworm. In the second group are those in which the causative organisms are present in the discharges from the mouth, nose, or throat, such as pneumonia, influenza, diphtheria, scarlet fever, measles, whooping-cough, infantile paralysis, smallpox, mumps, and tuberculosis.

I

As illustrations of the methods of transfer and problems of control of disease due to germs in the intestinal or urinary discharges, hookworm and typhoid fever will be considered.

HOOKWORM

Hookworm is a chronic, communicable disease characterized by anemia, malnutrition, palpitation of the heart, bodily weakness, and disinclination to exertion. The disease appears to retard children mentally, increases the number of miscarriages and stillbirths, and leads often to impotence in the male and sterility in the female. The disinclination to exertion, incapacitating persons from one-fourth to one-half of the time, has caused often a false diagnosis of laziness or stupidity. It is referred to in popular parlance as the germ of laziness. Another serious aspect of hookworm is the resultant lowered resistance of the individual, thus predisposing to tuberculosis,

malaria, typhoid, pneumonia, and other diseases which prey upon lowered vitality.

Distribution and Extent.—The hookworm disease is confined largely to the tropical and subtropical countries, in this respect being comparable to many protozoan diseases. In colder climates, such as those of Wales, Belgium, France, Holland, and Germany, it occurs only in mines and tunnels. The International Health Board of the Rockefeller Foundation estimates that out of a total of some 1,700,000,000 of people inhabiting the earth, over 900,000,000 live in countries where hookworm infection is a serious menace to health and working efficiency. It is most prevalent in Africa, and was doubtless introduced into America by the negro slaves. As a matter of fact, the hookworm district of the continental United States corresponds closely to the old distribution of slaves. It includes the Atlantic coastal plains from Virginia southward, merging with the Gulf Coast, to the Rio Grande; it extends over the Piedmont district, the Cumberland and Tennessee plateau, and the alluvial plains along the Mississippi from Missouri south, with the inclusion of at least the Kentucky side of the Ohio. The states included in this section are the Virginias, the Carolinas, Georgia, Florida, Mississippi, Louisiana, Texas, Arkansas, Tennessee, and Kentucky—a part of the country containing nearly a million square miles, with a population of more than 25,000,000, of whom about a third are of slave stock.

Although the negroes have a considerable immunity, and show few symptoms as compared with the whites, they act as reservoirs and distributors of the infection, and it is a very common infection among the poorer classes in the South. Surveys indicate that in regions where no efforts have been made to control it, as high as one-third of the adult and more than one-half of the children under sixteen years examined harbor the parasite. The economic loss to the South due to hookworm is estimated at from $300,000,000 to $500,000,000 a year.

Its Cause.—Hookworm is caused by a small round worm, the American variety of which, known as *Necator Americanus,* is about one-third of an inch long. This worm attaches itself,

to the inner lining of the intestines and there sucks and poisons the blood of its victim. The female worms are prolific egg layers, which are found in the intestinal tract of the infected person. As long as they remain in the intestinal tract these eggs do not hatch. When passed from the body and deposited on the ground, if the conditions of air, heat, and moisture are in the least favorable, they hatch in twenty-four to forty-eight hours. Although there are other possibilities of infection, by way of water, food, or contaminated fingers or objects, in about 90 per cent of the cases the young worm enters the body through the skin. Infection is very common among people who go about barefoot. After entering the human body through the pores of the skin, boring through bare hands and feet where these parts of the body are brought into contact with the soil where they exist, the worm passes into the circulating blood, finally again reaches the intestinal tract, and the life cycle is completed.

Methods of Control.—Two methods have been used to control hookworm. One is to treat infected persons with thymol and other worm medicines, to destroy the worms in the intestines and thus cure the individual patient. The other method is that of prevention, which is fundamental and yet simple. It necessitates proper sewage disposal—*i.e.*, proper facilities for the care of human excreta so as to avoid the pollution of the soil and the consequent infection of new victims.

When human excreta are properly cared for, hookworm disappears. This explains the absence of the disease in cities, where sewerage systems exist. Results equally satisfactory can be obtained in rural districts by the installation of sanitary privies. "In demonstrations in forty-three different states and countries the International Health Board has shown that hookworm disease may be controlled with striking success by the application of such methods. Thus in Richmond County, Virginia, where this work was first begun, the proportion of school children infected with hookworms, which reached the enormous figures of 83 per cent in 1910, was reduced to 35 per cent in 1911 and to slightly over 2 per cent

in 1921. A parallel reduction in other intestinal diseases has followed these improvements in sanitation. Thus in Troup County, Georgia, between 1917 and 1921 the cases of dysentery were reduced from 486 to 29 and the cases of typhoid fever from 177 to 15."[1] The experience of this Foundation shows that by an expenditure of about 65 cents per capita, inefficient poor Southern whites may be turned into working citizens.

TYPHOID AND CIVILIZATION

Typhoid fever is an acute infectious disease, characterized by a long spell of fever, and, in case of recovery, by a long period of convalescence. It is usually many months after an attack of typhoid before the patient has recovered his original health. When it is remembered that prior to 1910, rates of 100 deaths per 100,000 population were not uncommon, and that until recently there were between 300,000 and 500,000 cases of it in the United States, with 35,000 deaths, annually, its seriousness to society may well be imagined.

Some one has called typhoid a discovery of modern civilization. A hundred years ago it was unknown, and it was the early attempts at differentiation from typhus which gave it the name typhoid. In 1829 Louis differentiated these two diseases clinically, but it was quite a number of years afterward that physicians generally recognized the difference, and it was not until 1879 that Budd, an English physician, established the fact that typhoid fever was, as then expressed, "contagious." Just as typhoid is a discovery of modern civilization, so its prevalence in any community is an index of the civilization of that community. The justice of this charge will, it is hoped, be evident from the subsequent discussion.

The Causal Organism and Its Source.—The organism causing typhoid was discovered in 1880. It is known as *Bacillus typhosus,* and enters the body with food or drink through the mouth, invading the system through the intestinal mucous membrane. The germs leave the body in the intestinal discharges and frequently in the urine. Typhoid

[1] WINSLOW, *Man and the Microbe,* p. 19.

bacilli grow particularly well in the urine, being present sometimes in such large numbers that the urine resembles a broth culture of typhoid germs. As high as 3,000,000,000 bacilli per cubic centimeter have been observed in urine. The source of infection, therefore, is always the intestinal discharges or urine of man, and man can be infected only by ingestion—that is, by swallowing the germs.

Modes of Transmission.—The germs of typhoid do not live for any length of time outside of the body. They die quickly in soil, live for several weeks in water, and for longer periods in ice, milk, and food. Their presence in these commodities, and any danger from infection from them, are dependent, therefore, on rather fresh contamination by human sewage. From these facts we can understand readily the common methods of distribution, as well as what is necessary for effective control. The primary agents of distribution will be considered briefly in turn.

Water.—Drinking-water is an important distributor of typhoid. Numerous epidemics have been traced to water supply, and "if proof were needed," says McLaughlin, "to demonstrate the importance of water in high typhoid rates, hundreds of charts could be made from cities showing the spectacular effect, on the typhoid death rate, of substitution of a pure for a polluted water supply."[1] In Munich, Germany, a death rate from typhoid of 291 per 100,000 was reduced 97 per cent by replacing a wretched lack of system by a good system of water supply and of sewerage. Installation of a water filter in Lawrence, Mass., reduced the deaths from this cause from 105 to 22 in one year.

Typhoid bacteria live longest in cold water, or in the winter. Hence water-borne typhoid epidemics are most likely to occur in the late fall, winter, or early spring, when the water is cold and when a rise in the level of the water may result in excreta containing germs being washed into the streams. It appears, too, that the distribution of cases is general throughout the whole area supplied with water from the polluted source, and is confined more largely to adults.

[1] McLaughlin, *op. cit.*, p. 162.

Ice.—Although the question whether typhoid is likely to be distributed by ice has been much discussed, no general conclusion has been reached. There is no authentic case on record where a large typhoid fever epidemic has been caused by infected ice. One or two small outbreaks have been attributed to it, but the evidence is not conclusive. While typhoid germs live in ice for several weeks, they do not multiply there, and those surviving probably lose their virulence. The danger from ice certainly is not great, even if we are not yet prepared to ignore the possibility of danger from it.

Milk.—It is relatively easy for milk to become infected, either through the use of polluted water in washing utensils or by direct contamination from a human carrier of the disease. Milk is a favorable medium for the growth of typhoid bacilli, and, as a result, enormous numbers of them may be ingested by persons using the contaminated milk. Some three hundred epidemics have been traced with practical certainty to milk, and undoubtedly there have been many others. Milk-borne epidemics of typhoid are of a rather explosive type, with numerous cases appearing within a few days and with a large proportion of cases among women and children.

The Carrier.—Typhoid patients retain the bacilli of the disease in their alimentary canals for some time after recovery. It has been estimated that 3 to 4 per cent carry the germs after convalescence, but this is probably too conservative a figure because intermittent shedding of the bacilli is very common in typhoid. The feces and urine may show negative results for weeks, and then suddenly the germs appear again. It seems that in these cases the organism becomes colonized in the individual, perhaps in the bile duct. There are cases on record where persons have "shed" typhoid bacilli for more than forty years after they had had the disease.

Such individuals are known as carriers, and the discovery that healthy persons may carry disease germs and spread disease without having any symptoms of that disease themselves is one of the most important epidemiologic facts added to our knowledge within recent years. The typhoid carrier is

perhaps the best known, but in 1884 Loffler found diphtheria bacilli in healthy persons, in 1892 carriers of cholera were discovered, and more recently their importance in poliomyelitis, meningitis, pneumonia, influenza, and other diseases has been determined.

The most famous carrier in the history of public health is a cook known as "Typhoid Mary," and Sober's exposition of this case did much to change the attitude of the public and the medical profession from regarding them as curiosities to an appreciation of their serious menace to the community. Between 1902 and 1907 this woman was employed in six different families and was the cause of typhoid cases in each one of them, infecting 26 persons in all. "In 1907 she was taken to a hospital and found to be a chronic typhoid carrier. She was released and was lost to sight for a time; but in 1915, 25 cases of typhoid occurred in the Sloan Hospital of New York and Mary was found to have been employed there. Many other cases were probably, though not certainly, traced to her activities, and it is even possible that she was the cause of the water-borne outbreak of 1,300 cases at Ithaca, N. Y., in 1903. Another carrier whose story is even more surprising was a farmer who had typhoid fever in Wisconsin in 1864. He recovered and moved to Camden, N. Y., where he set up in the milk business. In 1878 his daughter had typhoid, in 1886 his son-in-law, in 1893 another daughter, in 1897 another, and in 1903 and 1909 two hired men. Meanwhile Camden became notorious for its generally high typhoid rate, three-quarters of the cases being among the users of this farmer's milk. Finally, in 1900, some of this milk was sent to New York and caused an epidemic of 380 cases, when the New York authorities investigated, found the man to be a typhoid carrier, and cleared up the whole story."[1]

"Such individuals are naturally a source of danger to all with whom they come in contact. If a carrier is employed in a dairy, the community supplied with milk from this dairy is pretty sure to suffer from an abundance of typhoid. If employed as a cook, those consuming the food are likely to be-

[1] WINSLOW, *op. cit.*, pp. 13-14.

come infected. Unfortunately, there is as yet no satisfactory method of detecting such individuals. The only known method is to examine the excreta for typhoid germs, which is a long task, not always very certain, and one which manifestly cannot be applied to all members of a community indiscriminately. Even more unfortunate is it that at present we have no method of treating a typhoid carrier so as to rid him of the bacteria. Various methods have been tried, but without great success. Having no adequate means of protecting ourselves against these individuals, their presence in our communities undoubtedly explains in a measure the constant presence of typhoid in spite of all attempts to get rid of the more evident sources of infection." [1]

Other methods of primary infection of typhoid are direct contagion, raw oysters, raw vegetables, and the fly, which has already been discussed.

The Conquest of Typhoid.—For several decades preceding 1880, typhoid was one of the major communicable diseases. From 1847 to 1850 the average annual mortality from typhoid per 100,000 persons in England and Wales was 124.6. As late as 1865, 134 persons per 100,000 died of it in Massachusetts. Death rates from it were generally high, and in many communities considerably above those just cited. Since 1880, following the discovery of the typhoid bacillus, and with increasing understanding of the methods of transmission, the mortality rate has declined, and in the last quarter of a century its reduction has been really dramatic, as the tables on the following pages will serve to show.

There is little doubt but that milk, both in regard to the has been more marked in Europe than in the United States.) A table prepared by McLaughlin for the year 1910 shows that thirty-three principal European cities, with an aggregate population of 31,500,000, had a typhoid death rate of 6.5 per 100,000 as against a rate of 25 in 50 American cities, with an aggregate population of 20,250,000.

There is little doubt but that milk, both in regard to the difference in amounts consumed and in methods of handling,

[1] Conn and Conn, *op. cit.*, pp. 327-328.

TABLE I

ANNUAL TYPHOID MORTALITY RATES, PER 100,000 POPULATION, IN ENGLAND AND WALES: 1871–1920[1]

Period	Average Annual Rate for Five-year Period
1871–75	37.4
1876–80	27.7
1881–85	21.6
1886–90	17.9
1891–95	17.4
1896–00	17.5
1901–05	11.3
1906–10	7.0
1911–15	4.7
1916–20	2.3

TABLE II

ANNUAL TYPHOID AND PARATYPHOID MORTALITY RATE, PER 100,000 POPULATION, IN UNITED STATES REGISTRATION AREA[2]

1900	35.9
1901	32.3
1902	34.3
1903	34.1
1904	31.7
1905	27.8
1906	31.3
1907	29.5
1908	24.3
1909	21.1
1910	23.5
1911	21.0
1912	16.5
1913	17.9
1914	15.4
1915	12.4
1916	13.3
1917	13.5
1918	12.6
1919	9.2
1920	7.8
1921	9.0
1922	7.5
1923	6.8

explains in part the higher American rate. Americans use a good deal more milk as a beverage than Europeans, and the latter almost universally boil or heat such milk as is consumed, principally to prevent souring because of the absence

[1] *Eighty-third Annual Report, The Registrar-General, England and Wales*, London, 1922, p. 35.

[2] *Annual Reports, Mortality Statistics, op. cit.*

of ice. In northern European cities, where milk and water are considerably less important as factors, a minimum point in residual typhoid has been reached.[1]

Progress in the United States, if delayed, has been satisfactory in recent years, as evidenced in the following table:

TABLE III

DEATH RATE PER 100,000 POPULATION

City	1920	1915	1910
Yonkers, N. Y.	0.	8.8	9.7
Paterson, N. J.	0.7	4.6	7.1
Rochester, N. Y.	1.0	5.9	10.6
Chicago, Ill.	1.1	5.3	10.9
Scranton, Pa.	1.4	13.4	14.5
Boston, Mass.	1.5	5.4	8.8
Newark, N. J.	1.9	2.9	10.7
St. Paul, Minn.	2.1	7.5	10.6
Seattle, Wash.	2.2	2.9	10.5
New York, N. Y.	2.5	6.3	11.0
Los Angeles, Cal.	2.5	5.8	11.5
St. Louis, Mo.	2.6	7.0	16.0
Minneapolis, Minn.	2.6	7.9	11.9
Lowell, Mass.	2.7	16.4	7.5
San Francisco, Cal.	2.9	8.8	15.2
Columbus, O.	2.9	13.2	13.8
Cleveland, O.	3.0	7.0	13.9
Cincinnati, O.	3.2	7.6	11.4
Philadelphia, Pa.	3.4	6.7	14.5
Baltimore, Md.	4.7	20.2	27.5

Typhoid fever is one disease in which we have all the knowledge and weapons necessary for its complete eradication. There is absolutely no excuse for its continued existence. Any community which will spend a reasonable amount of money and apply relatively simple measures can be free of it. The installation of a pure water supply and an adequate sewerage system, the compulsory pasteurization of the milk supply, the careful study of each case discovered, and a bacteriological examination of all convalescents will bring the rate very near to zero. Certainly there is nothing extraor-

[1] McLaughlin, *op. cit.*, pp. 165-166.

dinary or impossible in such a program for any community in the United States.

II

The second group of communicable diseases most prevalent in the temperate zone are those in which the causative organisms are present in the discharges from the mouth, nose, or throat. As illustrations of these diseases and their methods of transference, pneumonia and influenza will be considered. In 1920 these two diseases together were responsible for almost twice as many deaths as was tuberculosis—pneumonia causing 10.5 per cent of all deaths and influenza 4.5 per cent.

THE PNEUMONIAS

Pneumonia is not a single disease, caused by a specific germ, as has been the case with the various diseases which have been discussed so far. It is rather a term under which are grouped various clinical entities, characterized by acute inflammation of the lungs, and caused by a number of different germs. It is to be noted, also, that certain forms of pneumonia, such as broncho-pneumonia, are seldom primary, but usually secondary to measles, influenza, whooping-cough, and other diseases.

Apparently there are four distinct types of pneumonia, based upon immunological reactions. "Types I and IV, for instance, are the milder types with death rates around 20 to 25 per cent. Types II and III are the severe types with death rates that range from 40 to 50 per cent. Happily, Types I and IV constitute at least 70 per cent of all the pneumonia cases and the other two make up the remaining 30 per cent.

"Mild Type I is the characteristic pneumonia of the young. It constitutes about half the lung pneumonia that attacks young people up through the early years of adult life. Severe Type III usually attacks people past the prime of life, especially women. The high death rate of Type III is probably due to its predilection for the old and its tendency to run a longer course than the others. Serious complications from

other infections occur more frequently with Type I than with the others, but Type II is the one pneumonia of septicemia, and when septicemia sets in the end is almost always fatal. Types I and II are pneumonias that can be picked up first hand, but III and IV usually appear after the patient has contracted some other respiratory infection."[1]

The mortality resulting from pneumonia in its various forms has been consistently high, as the following table serves to show:

TABLE IV

DEATHS FROM PNEUMONIA PER 100,000 POPULATION IN THE REGISTRATION AREA OF THE UNITED STATES

1900	180.5
1905	148.8
1910	147.7
1911	133.9
1912	132.4
1913	132.6
1914	127.3
1915	133.1
1916	137.8
1917	150.5
1918	282.2
1919	123.5
1920	137.3
1921	88.2
1922	102.1
1923	109.0

Distribution and Incidence.—Pneumonia occurs everywhere, but is more prevalent in the cold and temperate climates than in tropical and semi-tropical countries. It takes its toll at all ages, different forms apparently afflicting different ages. It occurs during all seasons, but is most prevalent during the winter and spring. It is usually present in endemic form, but occasional epidemic outbreaks occur. Instances of such epidemics have been reported among laborers on the Panama Canal, among the native workers in the diamond mines on the Rand, and recently among troops in the United States army camps during the winters of 1917 and 1918. Mortality from pneumonia easily took first rank as the cause of death during the World War, and in civilian populations it kills

[1] "What We Know About Pneumonia," *Science News Letter*, Washington, D. C., February 19, 1927, p. 115.

more persons annually than any other disease with the exception of heart disease. The not inappropriate title of "Captain of the men of death" has been given to it.

The Epidemiology of the Pneumonias.—The pneumonias are of the oldest diseases in authentic medical history, their undifferentiated presence and contagious character having been considered by Savonarola of Venice as early as 1497. They are by far the deadliest of the acute communicable diseases. Nevertheless, only recently have they been considered as a problem in preventive medicine. Some interesting work has been done at the Rockefeller Institute for Medical Research, and in 1922 a committee of ten fellows and members of the American Public Health Association was appointed to study the problem of pneumonia prevention. As a result of this awakening, belated though it be, some progress in the identification, classification, and habits of the germs causing the pneumonias has been made. Much more, however, remains to be done.

Certain significant facts in the epidemiology of these diseases, now fairly well established, may be stated here. They clearly belong to that group of contact infections which are spread by secretions from the respiratory tract and which enter the system through the same channel. The germs causing these diseases are known as pneumococci. Of the four kinds of pneumococci which have been classified, three (Types I, II, and III) seem quite stable and are spoken of as fixed types. Group IV is made up, apparently, of many different strains not included in the other three groups. All pneumococci appear to be very frail, not multiplying outside of the body, indirect transmission, therefore, being unlikely except with fresh infectious material. This means that man is the chief source and reservoir of these organisms, and that the infection is spread rather directly from man to man.

A good deal of emphasis is now given to the rôle of the human carrier in the spread of the pneumonias. It has been established that pneumococci are found in the mouths and throats of many healthy persons. In fact, Rosenau avers,[1]

[1] ROSENAU, *op. cit.*, fifth edition, 1927, p. 236.

on the basis of his Boston studies, that practically every person becomes a carrier of a fixed type at some time during the course of a year. He implies that the carrier is of outstanding importance in the spread of these diseases. Fortunately, the first three types of pneumococci are not generally found in normal throats, but Type IV occur seemingly in the throats of about half of all healthy individuals. Unfortunately, no known measures will relieve the pneumococcus carrier.

A promising step in "pneumonia control," the first to be attempted in this country, was undertaken in Pittsburgh, Pa., in 1924. The 1923 report on mortality statistics in the United States had shown Pittsburgh to have a higher death rate from pneumonia than any other city in the country. Its rate, in fact, was three times as high as that for the country as a whole. On April 1, 1924, the city health department put into effect a modified quarantine of the disease, demanding the strict isolation of the patient until death or recovery, but with no restrictions on other members of the household. An educational campaign had preceded the inauguration of this policy, so that there was a minimum of complaint from physicians and public.

The results are striking. The pneumonia death rate for 1924 (with nine months of quarantine) was 331 per 100,000 population, as compared with 371 in 1923. In 1925 it fell to 264, and the first eleven months of 1926 show a further decline to 168, in spite of an unusual amount of influenza and pneumonia which swept the country in the spring of that year. Chance fluctuation could scarcely account for so striking a change. Dr. C. J. Vaux, director of the department, after due scientific reservation, believes the results of the policy to be sufficiently encouraging to warrant "a continuance of this first step in an attack on the pneumonias."

The prevalence of pneumococci in the mouths and throats of healthy persons would suggest the importance in infection of the lowered resistance of the individual; and medical opinion now accepts the view that "susceptibility, predisposing causes and accessory factors play an important rôle

in determining the disease." [1] Weakening diseases, alcoholism, exposure, fatigue, unbalanced diets, old age, over-exertion, trauma, local irritations—all tend to diminish resistance to pneumococci. In the many cases of enfeebling conditions or debilitating affections where pneumonia closes the scene, it is quite necessary that the role of the predisposing factors be recognized.

Serums and Vaccines.—Careful students appear rather cautious in discussing the value of the vaccines and serums now utilized in this connection. "The process has been complicated by the fact that each of the four types of pneumonia produces its own type of immune bodies. In order to treat a case successfully the prepared serum must contain the special immune substance for that particular kind of pneumonia from which the patient was suffering. To meet this condition various sera have been put into practical use for pneumococcus pneumonia that all contain specific immune bodies that work against more than one type of the disease.

"The big problem at present in the specific therapy of pneumonia is to get in an adequate amount of the immune substance without shocking the patient. As soon as the chemist has purified anti-pneumococcus serum to such a point, the specific treatment of pneumonia will be just as efficient as that for diphtheria or scarlet fever, though here, as in other infections, early treatment is essential.

"During the World War the value of preventive vaccination was amply demonstrated. Thousands of soldiers were vaccinated with a triple pneumococcus vaccine with very satisfactory results. Dr. Cecil . . . says that it is a comparatively simple matter to vaccinate monkeys against the different pneumonias and have them remain immune from six to eight months. He recommends vaccination as a practical prophylactic measure for soldiers in armies and for individuals who have had several attacks of pneumonia and live in fear of others. The results, he says, from vaccinating several such persons in his experience, have been very good, for in each case there have been no recurrences. With a concentrated and

[1] Rosenau, *op. cit.*, p. 235.

purified solution of pneumococcus immune bodies it should eventually be possible to maintain the sterility of the patient's blood in all types of pneumococcus pneumonia, and thereby cause a marked reduction in the death rate of this dreaded disease." [1]

INFLUENZA

The term influenza has become both popular and vague. It is applied to a variety of different types of infection such as colds, bronchitis, catarrhal inflammations, nervous indispositions, and gastro-intestinal disorders. What is known as the "grip" is perhaps a mild and ever-present form. In addition to these miscellaneous disorders, there may be a specific influenza infection. Most students point out that influenza is not a clinical entity, and its manifestations are decidedly complex and varied.

Its History.—Influenza is a disease with a long and eventful history, dating back certainly to the fifteenth, and probably to the twelfth, century. It is a disease of cycles. There have been some eighty epidemics of it since 1173, eighteen of which have occurred on the North American continent since 1627. Fourteen times since 1510, when the first authentic instance was described, it has been pandemic.

The special characteristics of the great pandemics are their rapid spread, wide area of distribution, and definite progression along the most widely used routes of trade and travel. No other disease compares with influenza in its pandemic form in the number of persons attacked within a short period of time. It attacks a country with explosive violence. Between the pandemic outbreaks, which come at irregular intervals of a generation or two and during which there is apparently a thorough seeding of the population with the microbic cause, there occur epidemics local and sporadic, with progressively less resemblance to the mode, rapidity, and scope of the pandemic outbreaks.

The last pandemic occurred in 1918-19. It was world-

[1] *Science News Letter, op. cit.*, p. 116.

wide, and it is estimated that there were more than 200,000,000 cases and in excess of 10,000,000 deaths within twelve months. In India, almost 5,000,0000 deaths were reported as resulting from it between June and November, 1918. It started in malignant form in this country in Boston, on Commonwealth Pier, in September, 1918, and by November it had spread over the entire country. By January it was on the wane, by March it had virtually subsided. Studies of its prevalence by the Public Health Service in eleven well-distributed localities of the United States show that on an average about 280 persons per 1,000 were attacked. If this rate is applied to the entire population, as seems to be reasonable, it appears that nearly 30,000,000 persons were affected.

Nature of the Disease.—Influenza is an acute disease, with fever, pain in the head and other parts of the body, and with a subsequent prostration or bodily weakness out of all proportion to the other symptoms. The clinical features vary with each outbreak, and there is no criterion by which the disease may be recognized. In some pandemics, the nervous form is common, as in 1889-90. There is a gastro-intestinal form. Usually some respiratory form predominates. In the recent outbreak, pneumonia complications were most conspicuous and relatively fatal. In fact, Rosenau avers[1] that influenza itself probably never kills, death being due to some complication, usually pneumonia. Peculiar features of the disease are an early drop in the circulating white blood cells, a lowering of resistance of the lungs to secondary infection by common bacteria, resulting in a high incidence of severe and fatal secondary pneumonia. Whatever its form, no other disease is more disabling to community life, because its quick spread, high incidence, and prolonged prostration place so many people on the non-effective list at the same time. Community life becomes temporarily paralyzed during the course of an influenza epidemic.

The Cause.—The recent pandemic greatly increased the general interest in this disease, and scientists the world over

[1] *Op. cit.*, p. 240.

are studying it. Thus far, little is known as to its cause. A bacillus, discovered by Pfeiffer in 1892, was called the influenza bacillus, and for a time the disease was attributed to it. Since 1918 it is claimed to be caused by a filterable virus, as yet undetermined. If, however, we do not as yet know the germ or virus which causes it, we do know that it strikes quickly, has a short incubation period, lowers the patient's resistance, particularly to respiratory infection, and confers no immunity.

The Transfer of Influenza.—The disease travels ordinarily from east to west; it occurs at all seasons, with a preference, but no requirement, for cold weather; it attacks all ages and both sexes, with a predilection for strong, robust young men between twenty and thirty, and for pregnant women; it spares neither class nor race; hygiene and sanitation apparently have no effect upon control. The common assumption is that the causative organisms leave the body in the secretions from mouth and nose, and enter through the same channel. Infection is thought to be through direct and indirect contact and droplet infection. Water, milk, and food thus far stand unconvicted as carriers. Its extreme contagiousness causes many to believe that it is air-borne. Sometimes it seems to outrun travel, and epidemics break out simultaneously in widely separated parts of the globe.

Problem of Control.—In view of the lack of established facts concerning its cause and manner of spread, our methods of control lack precision, confidence, and, be it added, success. Apparently the measures taken in 1918-19, such as wearing of masks and the closing of schools, theaters, and other places of assembly, had no appreciable effect. Attempts have been made to produce a protective serum, and also bacterial vaccines, but the results so far reported are contradictory and uncertain. Personal prophylaxis, following the lines laid down for other infections transferred by mouth and nose secretions, is the only method of control generally agreed upon as of any value.

Results of Recent Research.—It is possible that the situa-

tion is not quite as hopeless as has been implied, because of the promise of recent researches.

In September, 1918, it was decided to undertake a search for the infectious agent of epidemic influenza in the laboratories of the Rockefeller Institute of Medical Research. The task was undertaken by Drs. Peter K. Olitsky and Frederick L. Gates. At first monkeys, and subsequently rabbits, were used for experimental purposes. "In November, 1918, certain extremely minute but characteristic spindle-shaped bodies were observed in strictly anaërobic cultures of the filtered nasal washings of an influenza patient in the early hours of the disease. In size they approached the limit of vision with the highest powers of the microscope, so that the sparse growths in the early cultures were identified with the greatest difficulty."[1] This microbe was called *Bacterium pneumosintes* —a bacterium that injures the lungs. Conclusive evidence of the identity of *Bacterium pneumosintes* and the virus from the human nasal washings was furnished by a series of experiments which showed that a previous infection with either one of these pathogenic agents rendered an animal immune to attack by the other.

Experiments with this microbe were extended over several years and the results were tried out during the recurrence of epidemic influenza in New York City in January and February, 1922. The conclusions arrived at by Olitsky and Gates, as stated by themselves, follow: "As a result of this investigation at the Rockefeller Institute a hitherto undiscovered organism, *Bacterium pneumosintes,* has been isolated from the nose and throat secretions of influenza patients in the early hours of the epidemic disease. It is filterable, anaërobic, resistant, and pathogenic for rabbits, in which it induces a typical infection seemingly identical with epidemic influenza in man. The significant features of this experimental infection are the changes in the blood cells and the production of a characteristic injury to the lungs associated with a defect

[1] Olitsky, Peter K., and Gates, Frederick L., in *Science Remaking the World,* Doubleday, Page & Company, New York, 1924, p. 107.

in their resistance to secondary invasion with common pathogenic bacteria.

"All the strains of *Bacterium pneumosintes* have similar properties, indicating a common source. Animals subjected to a primary infection, or injected with living or killed organisms, are immune to subsequent injections. The killed bacteria induce specific antibody formation even when injected subcutaneously in doses well tolerated by man. The blood serum of recovered influenza patients contains antibodies for *Bacterium pneumosintes*, whereas that of normal persons does not.

"These experimental observations, reported elsewhere in greater detail, especially in view of the source of the cultures, their effects in rabbits, their identity, and the presence of specific antibodies in the blood serum of recently recovered influenza patients, point to *Bacterium pneumosintes* as the bacterial incitant of epidemic influenza. Moreover, many of the essential facts brought out in this study have been confirmed by Loewe and Zeman, and by Baehr and Loewe in New York, by Gordon in England, and by Lister in South Africa. The significance of similar observations from such widely separated localities is obvious. But medical science is apparently at the threshold of knowledge of a group or class of minute microörganisms which the anaërobic Smith-Noguchi technique and more recently developed methods of cultivation have thrown open to exploitation. This new field of bacteriology invites further investigation. It has seemed wise merely to report the experimental facts so far obtained and to defer the final decision on the precise relation which *Bacterium pneumosintes* bears to epidemic influenza until further experience is obtained."[1]

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CHAPTER XII

THE COMMUNICABLE DISEASES—*Continued*

One communicable disease has been reserved for discussion in a separate chapter. The relative importance of tuberculosis, as reflected in the large number of deaths due to it annually; the terrific amount of misery and inefficiency resulting from it; and the many aspects of public health work involved—appear to warrant such an emphasis in a study of social well-being.

SOME FACTS ABOUT TUBERCULOSIS

Tuberculosis has been known for centuries, its origin being lost in the mists of antiquity. Its existence has been demonstrated in the spines of mummies of early Egyptian civilization. Hippocrates gives an excellent description of its pulmonary form, and many medical writers of ancient Greece and Rome mention it. It is distributed all over the world, and attacks all races of mankind. In the temperate and colder climates, where it is most common, it has been until recently the largest cause of human disease and death. The problems of tuberculosis are many and varied, and many of them are still without adequate solution. The printed works on tuberculosis outnumber those on any other disease. A more monumental mass of data has been collected concerning it than any other human ailment. Although there is the greatest necessity for popular education in regard to it, the task of anyone writing about it is almost insuperable—to be comprehensive, yet concise; to be definite, yet fair and judicial about many important matters in controversy; and to keep in proper perspective a large and complex body of data of variable value. Manifestly, it is possible here to set forth but a few facts, considered to be essential, with the hope of stimulating

interest which will carry the reader to some of the authorities on the subject.

What Tuberculosis Is.—Tuberculosis is a general term given to all diseases due to the action of the tubercle bacillus. "It takes its name from the formation of 'tubercles' which is so characteristic of this infection. The tubercles, or 'little lumps,' consist of an aggregation of small epitheloid cells derived from the tissue cells because of stimulation by the tubercle bacillus. These cells are arranged usually around a giant cell in the center and surrounded by white blood cells. The tubercle bacilli are distributed among the cells. At first small, later the 'tubercles' become easily visible and attain the size of millet seeds, from which the name 'miliary' tubercle was derived. When tubercles break down, caseous degeneration, or 'caseation,' takes place, so called because the contents now resemble cheese. This is really death of the cells of the tubercle, caused by the toxins produced by the bacillus."[1]

Infection with the tubercle bacillus may affect any tissue of the body. The most common form, however, is of the lungs, and this is responsible for about 90 per cent of all deaths resulting from this disease. Children are more commonly affected with tuberculosis of the lymph nodes, bones, and joints than they are with pulmonary or lung tuberculosis, and these types are far less fatal than the pulmonary.[2]

Prevalence and Cost in the United States.—Tuberculosis has been called the "Great white plague," and the "Captain of the hosts of death." Its prevalence fully justifies these designations. Until recently it was the largest cause of human disease and death in the temperate climates. In 1922, with a death rate from all forms of tuberculosis of 97 per 100,000 population, the lowest thus far reported in the registration area of the United States and less than half of what it was in 1900, it was the cause of 8.2 per cent of all deaths. Even at the present lowered rate, more than 100,000 persons die

[1] McLaughlin, *op. cit.*, p. 131.

[2] For a short, readable account of what tuberculosis is, and its chief forms, see Williams, L. R., *Tuberculosis*, Funk & Wagnalls Company, New York, 1924, Chaps. II, IV, and V.

of it annually in this country, and since 1900 the total loss of life because of tuberculosis in the United States has been in excess of 2,000,000.

In addition to the annual loss by death, nearly a million persons in this country are sick with it part of the time, and at least half as many are under constant treatment. The amount of suffering is incalculable, and the economic cost appalling. Rosenau [1] estimates that tuberculosis costs the United States annually about $500,000,000, while Haven Emerson places the wastage from it in 1922 in terms of dollars at $850,000,000. Williams concludes [2] that the loss of earning power and the cost and care of the sick since 1900 totals about $10,000,000,000.

One reason why tuberculosis is such an enormous economic burden is that it is most common in early adult life. It destroys in the most productive years. Practically half of all deaths resulting from it are of persons between twenty and forty years of age, and of all deaths occurring within these age limits, about one-fourth result from this disease. Coupled with this is the fact that tuberculosis is fast becoming, in fact already is, a class disease; it is more prevalent among the poor than the well-to-do. Thus it is easy to understand why this disease in particular has become a sociologic problem and why it plays so important a role in the records of the various charitable organizations. "Out of a total of $23,500 expended by the New York Association for Improving the Condition of the Poor in one month for relief other than relief of an emergent character, $9,000 was expended for material relief for families in which tuberculosis was a definite factor. The dependent widow group in this organization requires a still larger expenditure than tuberculosis, but in a recent analysis of this group it was found that 41 per cent of these families are in need of relief because of the fact that the husbands died from tuberculosis. A study of all the dependent widows cared for by the Board of Child Welfare of New York City indicates that 42 per cent of the fathers of these families had

[1] Rosenau, *op. cit.*, p. 158.
[2] *Op. cit.*, p. 1.

died from tuberculosis. Taking this factor into consideration, it will be seen that this disease alone accounts for over one-half of the money spent for dependent families by an organization in New York City spending large sums annually on the problems of dependency." [1]

The Cause of Tuberculosis.—As has been stated, tuberculosis is caused by the tubercle bacillus, isolated by Koch in 1882. Sixteen years later Theobald Smith established the difference between the human and bovine strains of the parasite. Two other strains, avian and piscidian, have been identified, but are not pathogenic for man. The human bacillus is strongly pathogenic for man, but not much so for cattle, rabbits, and other animals. The bovine type is very pathogenic for all animals, and for man, too, but less so than the human type.

Bovine tuberculosis in man has been a challenging problem, and agreement in regard to the matter is not yet complete. The theory has been advanced, and there are certain crude facts to support it, that adult tuberculosis is due to bovine infection, acquired through milk in childhood. On the other hand, Rosenau contends [2] that the danger to man of bovine tuberculosis has been exaggerated greatly, that about 25 per cent of all tuberculosis under five years is due to it, but that pulmonary tuberculosis in man is practically never associated with the bovine bacillus, and that only about one-half of 1 per cent of all deaths from this disease are due to the bovine bacillus. He does agree, however, that the more deeply we go into the subject, the more important the bovine side of the question becomes, especially in connection with surgical and abdominal forms, not only in the child, but even in the adult.

Modes of Transmission.—As already stated, the most common diseased condition caused by the tubercle bacillus is a chronic infection of the lungs, and the most characteristic symptom of this condition is cough. In the expectoration of a person thus affected there are found usually millions of viru-

[1] Bogart, Baily M., "Social and Economic Factors in Dependency," an address before the Jewish Welfare Society, Philadelphia, September, 1924.

[2] Rosenau, *op. cit.*, p. 160.

lent germs. Practically all observers agree with Koch that in infection from man to man, human sputum is the main source of tuberculosis. Infection from the bovine source is affected as a rule through unpasteurized milk, and usually takes place in childhood.

The bacilli enter the human body through inhalation into the respiratory tract, or by ingestion into the alimentary canal. Which of these two is the more usual avenue of infection is as yet undetermined. Vaughan believes[1] that it occurs chiefly through inhalation, and experiments with guinea-pigs show that it requires very few bacilli by inhalation to produce the disease, whereas many hundreds and even thousands are required to cause infection by ingestion. On the other hand, some authorities contend that in most cases of tuberculosis the infection is contracted in childhood, but that the disease develops later, and that much of the tuberculosis in children comes through the alimentary tract. Calmette has gone so far as to say that the immense majority of cases of pulmonary tuberculosis in man is caused by ingested bacilli and not by inhalation, and his view has gained many adherents. The whole question needs further study.

With reference to the methods of transfer of germs from infected to other persons, it appears safe to say that in the majority of cases the disease is contracted through "contact" infection. The term implies close association, though not necessarily actual contact, between the sick and the well. This explains why tuberculosis is regarded generally as a family or house disease. From this standpoint, it makes little practical difference whether the infection enters the body through the respiratory tract or the digestive tube. It is now believed that infection occurs usually during childhood, but remains latent until adolescence or early adult life, when the disease becomes clinically apparent.

Th Life of the Tubercle Bacillus.—The tubercle bacillus belongs to a hardy race, a fact which has great practical bearing upon the study of the transmission of the disease and the

[1] Vaughan, Victor C., *Epidemiology and Public Health*, C. V. Mosby Company, St. Louis, 1922, Vol. I, p. 438.

problems of social control. Protected properly from the sunlight, it may live in dried sputum for months; it may survive in water for a year, which is of considerable significance, since many bacilli find their way ultimately into drinking-water. They resist cold very well. Milk containing them may be kept frozen indefinitely, but when thawed the organisms will be found without change in structure or in virulence. They are highly resistant to the ordinarily employed chemical disinfectants. Direct sunlight, even for but a few minutes, kills them. On the other hand, putrefaction has little effect upon their viability. Highly virulent organisms have been found in sewage six months and longer after they have been placed therein.

Immunity and Susceptibility.—In approaching this subject, it is necessary to point out the difference between tuberculosis infection and tuberculous disease, for only a small proportion of those infected developed clinical tuberculosis.

It appears that almost everyone is at some time infected with tuberculosis. Indeed, there is good reason to suppose that while the death rate from this disease has decreased, the proportion of infection has increased. Fortunately, it is no longer as necessary as it once was to determine the extent of infection by autopsies, but it is now possible to do so with a simple test which is both harmless and painless. The Pirquet modification of the tuberculin test has given us a ready, safe and reliable method of determining the presence of tuberculous infection, and the resultant findings are so constant and uniform that they must be accepted. The universality of infection, especially in crowded cities, is no longer a matter of dispute. In some of the large congested cities 90 per cent of the children at the age of fifteen years show that they have been infected already, while for the entire number of school children in the United States the proportion is placed at from one-half to two-thirds. Rosenau reports that 70 per cent of persons over fifteen years of age give the Pirquet cutaneous reaction. Certainly no other infection is so universal among human beings.

The ratio between infection and disease make it clear that

man possesses a considerable resistance to tuberculosis. Although no complete immunity exists in man, it has been known for years that in persons who have had tuberculous glands of the neck during childhood, which have been cured completely before the age of fifteen, less than the average amount of pulmonary tuberculosis develops later in life. In other words, the existence of a tuberculous infection in a gland has conferred upon the individual a certain amount of immunity.

Similarly, it is held that individuals who have been infected during their earlier years have a relative immunity against the disease, to the extent that it is not likely to occur in these individuals unless they receive repeated doses of tubercle bacilli, or an extremely large dose at one time. This explains why it is the consensus of medical opinion that the majority of adults are immune to tuberculosis. It explains, too, the observation that the resistance to tuberculosis increases after middle age, due apparently to the immunity induced by earlier infections.

As a result, the theory has been advanced that those races which have been exposed for generations to tubercle bacilli have acquired gradually a resistance to infection "because the children in the race receive small infections, which are sufficient to prevent the development of the disease from new infections from without unless the later dose of the bacilli be very large. On the other hand, races such as the aboriginal negro, which have never been exposed to tuberculosis, when exposed to large doses develop an acute and severe disease; but if the same exposure is experienced by the Hebrew, who has already been infected and partly protected, only a mildly progressive disease is brought about. In other words, a small amount of infection confers a certain amount of immunity and a complete absence of infection leaves the individual highly susceptible to the disease."[1]

Certainly there is a marked difference in the tuberculosis mortality rate which prevails in the various nativity groups composing the population of the country. Dublin and Baker

[1] Williams, *op. cit.*, pp. 18-19.

have studied the rates for the principal stocks which constitute the population of New York and Pennsylvania. Dublin, in summarizing the results, says: "We found that the death rate was lowest among those born in Russia, who, in these two states, are for the most part Jews. This interesting fact has been observed again and again not only in the United States, but in other parts of the world where the mortality of the Jews has been carefully studied in comparison with their neighbors. Tuberculosis does not appear to be as fatal among them as among other races. The disease when it appears is more often of long duration. The rates are also very low among the Italians. In fact, at some age periods, the rates were actually lower among those born in Italy than among those of Russian birth. The Austro-Hungarians, who in these two states are also often of Jewish extraction, show very low rates. These three nativity groups at many of the age periods show lower tuberculosis rates than those for the native whites. The native whites, on the whole, present an intermediate position between these three nativity groups and those born in Germany, Great Britain, and Ireland. The highest rates are found among both males and females born in Ireland. This is more especially true in New York than in Pennsylvania, but in both states the conditions in this race are notoriously bad. In fact, at some of the age periods, the Irish males have as high tuberculosis death rates as have been found to occur among colored males. . . . It is difficult for anyone confronted with these facts to escape the conclusion that an inherited racial immunity is a factor in the development of tuberculosis. Certainly, everyone must recognize that, with reference to such cases as the Jews and the Italians, there is a constitutional resistance to tuberculosis, and that among the Irish there is a peculiar susceptibility to heavy mortality. The differences in economic status and modes of life are probably not sufficient to explain the extreme divergencies we have observed."[1]

Despite the importance to be attached to the constitu-

[1] Dublin, Louis I., *The Causes for the Recent Decline in Tuberculosis and the Outlook for the Future*, Metropolitan Life Insurance Company, New York, 1923, pp. 14-16.

tional factor, the fact of almost universal infection, together with the widely scattered nature of recognizable tuberculosis through our communities, puts a different aspect on the whole problem, indicating that in combating the disease, emphasis should be placed upon the means of increasing resistance, and not simply upon the methods of preventing the spread of the germs.

Predisposing Factors.—While the human body is capable of withstanding a certain amount of infection without the development of this disease, the balance between immunity and susceptibility is delicately adjusted and the margin of safety is not large. Tuberculosis is far more prevalent in early adult life than at any other period, and the disease usually develops after the individual has suffered from some acute disease or has been undergoing hardships, privations, overwork, lack of food, or other conditions which lower the resistance of the body.

The universality of infection, coupled with the fact that tuberculosis is a class disease, certainly seems to warrant this one conclusion: that the social and economic conditions attending the less fortunate members of society are important determining factors in the prevalence of tuberculosis, and chiefly because of their effect upon the resisting powers of the individual.

Because the relationship between conditions of living and disease in general is to be discussed in a subsequent chapter, it would involve needless repetition to consider these factors with special reference to tuberculosis. It appears not amiss, however, to emphasize here certain general facts. For generations it has been a matter of common observation that tuberculosis is more prevalent in the slum than in the palace; that poverty, with its attendant hardships—poor food, bad housing, overcrowding, overwork and worry—diminishes resistance to the disease; while prosperity, which buys good food, rest, change of air and scene, choice of occupation and diversion, increases resistance and enables the avoidance of contact with infection. Since the inception of the anti-tuberculosis movement, full recognition has been given to the im-

portance of improving those general conditions of life which we include usually in the term "standard of living." Individuals who have been leaders in this movement have also been leaders in the efforts for better housing, shorter hours of labor, better wages, and, in general, for an increase or raising of the standard of living.

The Facts Summarized.—At a risk of what may seem to be somewhat of a repetition, the essential facts about tuberculosis, established by painstaking scientific researches in various parts of the world, and now accepted and made the basis of all anti-tuberculosis efforts, will be summarized briefly at this point.

1. Tuberculosis is caused by the tubercle bacillus. Without the specific bacillus, there is no tuberculosis.
2. Children are born free of the disease. It is not hereditary.
3. Tuberculosis is a communicable disease.
4. Infection takes place usually through the respiratory and the digestive tracts.
5. Infection occurs, as a rule, during childhood. It may occur during the first year of life. Infection increases with age, and when adult life is reached between 50 and 90 per cent of the population carry the infection.
6. The sources of infection are twofold; man and animals. The relative importance of the human and bovine strains in causing human tuberculosis is not yet determined. Neither dare be neglected.
7. Infection does not mean disease. In the great majority of cases infection is not followed by disease.
8. Infection may develop into the disease without the individual concerned becoming conscious of it.
9. Tuberculosis is curable. The earlier treatment is undertaken, the greater is the probability of arresting the disease process.

THE ANTI-TUBERCULOSIS MOVEMENT

Origin and Leadership.—Tuberculosis has been an age-old and universal menace to the well-being of mankind, yet it is only within the last third of a century that the forces of society have been organized effectively against it. Once started,

the movement made rapid headway, and it has become the best organized and most adequately financed part of the public health program.

The leaders in this movement consisted of a small group of persons, some of them physicians and some of them laymen associated for the most part with social welfare agencies, all of them impressed with the ravages of the disease, and all sharing the conviction that, if considered as a communicable disease and attacked as such, it would be possible to arouse the public at large sufficiently to take the necessary steps for its eradication. Their program did not accord always with the orthodox views of the medical profession, but the opposition encountered from this and other sources failed to check the progress of the movement.

The first battle in the warfare against tuberculosis was won in 1882 when Koch discovered the tubercle bacillus. The next significant step forward came with the discovery of Trudeau of the curative value of outdoor living. The first association organized was the result of the efforts of Dr. Lawrence F. Flick, of Philadelphia, who was one of the pioneers responsible for the program of preventive measures now being emphasized throughout the country, and who organized in 1892 the Pennsylvania Tuberculosis Society. Ten years later, in 1902, the Tuberculosis Committee of the Charity Organization Society of New York City was organized, and the following year the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis was established in Philadelphia. Finally, the next year, 1904, at Baltimore, steps were taken which led to the organization of the National Tuberculosis Association. The formation of this association was, in many respects, the most notable public health achievement in this country. It was the first organization which concentrated all available forces against a single disease.

This association has served since as the leader and center of the campaign against tuberculosis in this country. It has been responsible for the 48 state and more than 1,300 local associations which have been formed. Its revenue is derived

from the sale of Christmas-seal stamps, and the annual response of the public is most gratifying. Nine-tenths of the money thus secured is spent in the communities making the contribution. The remainder goes to the national organization, which furnishes the seals, distributes educational material, makes contributions for special researches, and serves as the central bureau for the state associations.

Under the guidance of the national organization, important advances have been made in dealing with disease. The educational value of the annual December campaign has been invaluable. The money has been spent economically and judiciously. When the association began its work there were 100 hospitals and sanatoria with an aggregate of about 10,000 beds, less than half a dozen dispensaries and clinics, no tuberculosis nurses, no open-air schools, and no systematic community programs for the control of the disease. In 1922 there were over 700 hospitals and sanatoria, with a combined bed capacity of 60,000; there were 888 tuberculosis clinics, about 1,300 local associations, 3,000 open-air schools and fresh-air classes, about 1,000 public health nurses giving part or full time to tuberculosis work, and organized community programs in all parts of the country.

In addition, various anti-tuberculosis measures have been introduced and executed from time to time, which have had an important bearing, not only on problems of tuberculosis, but on other public health problems as well. In fact, the anti-tuberculosis movement has become so inextricably bound up with the general public health movement that it is somewhat difficult to separate the achievements of the former from those of the latter. In the same way that anti-tuberculosis measures have affected other health problems, so measures directed against other health problems have been helpful in the campaign against tuberculosis. Suffice it to say, then, that while the anti-tuberculosis movement has been part of the general health movement, it has been a most effective and inspiring and important part thereof.[1]

[1] There is an excellent summary of the work of this association in the Sixteenth Annual Report of the Henry Phipps Institute, Philadelphia, 1923, pp. 1-5.

CHIEF FEATURES OF THE ANTI-TUBERCULOSIS MOVEMENT

(1) *Curative Measures*

Curative work with tuberculous patients came about as the result of a gradual development, extending over many years. Three men stand out preëminently in this development: Bodington, the voice crying in the wilderness; Brehmer, the practical pioneer; and Trudeau, its sane and altruistic apostle.

First Beginnings.—In the early part of the nineteenth century, Bodington, who was a country doctor in England, did much for his tuberculous patients by insisting that they live continuously out-of-doors. Beyond helping his own clients, he succeeded apparently only in bringing down upon himself the ridicule of the medical profession of his day. At least no further application of the idea was made until around the middle of the century, and then it was a German rather than an English physician, Brehmer by name, who established a tuberculosis sanatorium in the mountain near Breslau. The treatment outlined by him consisted of graduated exercise in the open air for a prescribed number of hours a day, accompanied by regulated periods of rest, a substantial amount of food, and very little medicine. Brehmer gained quite a reputation, incidentally acquiring a fortune. One of his students, Peter Dettweiler, modified Brehmer's treatment and established a second institution, and he, too, achieved considerable success and recognition.

The Work of Trudeau.—The introduction of this method into the United States resulted from the experience and vision of Edward L. Trudeau. Born in New York, the son of a New Orleans physician, educated in New York and in Paris, with brilliant social prospects, he had scarcely begun the practice of medicine when he found that he had tuberculosis, the same disease from which his brother had died. In 1873 he went to Saranac in the Adirondack Mountains for a vacation—a hopeless victim, not expected to live six months. His friends were filled with horror at the prospect of his dying there, virtually alone. The general belief at that time was that fresh air was harmful instead of beneficial to sick persons, and, being

himself a physician and aware of these opinions, his medical advisers could only ascribe his plan to a suicidal mania. But he persisted, and his unconventional boldness saved his life. Under the influence of outdoor living, he greatly improved in health, and he was able soon to practice medicine among his mountain neighbors. About 1882, while reading of the work done by Brehmer and Dettweiler, he dreamed a dream. He saw the forest about his home melt away, and the mountain-side dotted with houses built inside out, as though the inhabitants lived on the outside. He made his dream come true. In 1883 he began to treat a few tuberculous patients, and in 1885 the Adirondack Cottage Sanatorium was opened. Such were the simple beginnings of fresh-air treatment of consumptives in this country.

For the first few years Trudeau and his little cottage sanatorium were recognized only by his personal friends. Traditional views are not overturned in a day. Gradually, however, his work became known, and today every state in the Union, nearly every large city, and many smaller cities and counties have public tuberculosis sanatoria, while the number of private institutions of this kind has grown year by year until today more than 700 are in existence. Until his death in 1915, the life of Edward Trudeau is the story in large measure of the anti-tuberculosis campaign in this country. Trudeau was not only a pioneer in treatment, but also in the scientific study of tuberculosis. For many years he was the only man in the country who prepared free cultures of the bacillus, the medical schools depending almost entirely upon him for their products. All in all, he contributed more than any other man of his time to the scientific knowledge of this disease.

Sanatoria.—As the name indicates, a sanatorium is a place for recuperation from disease. The purpose of the tuberculosis sanatorium is twofold: to cure incipient cases and to teach them to remain cured. Additional results are achieved. The sanatorium is distinctly preventive, in that it provides isolation facilities for active cases, removing them and the danger of infection from friends and families. Moreover, it

is of educational value. Its graduates go back to their communities as teachers, after having acquired some definite knowledge of the disease and its method of prevention. The educational effects, though difficult of determination, must be considerable.

There has been some criticism of the sanatorium on the ground that it has failed to accomplish what was originally, and is still, claimed for it. It should be remembered, however, that its purpose is to care for the early and supposedly curable cases, but that under the pressure of necessity too many sanatoria have been converted into comfortable places for the dying. Under circumstances at all favorable, tuberculosis sanatoria have demonstrated their value. The disease has diminished most in those countries where sanatoria are most in use. Their number needs to be increased. Tuberculosis is a local problem, and each local community needs to have its own facilities, or easy access to them.

Tuberculosis Hospitals.—Unfortunately, many persons, mostly of the working classes, do not have their condition diagnosed until the disease is well advanced and there is little hope of a complete arrest of their condition. For these advanced cases hospitals have been provided. A tuberculosis hospital is distinguished from a sanatorium by the degree of severity of the case which is sent to it. Incipient cases are sent to sanatoria, more advanced cases to hospitals. The tuberculosis hospital attempts, of course, to be curative, and sometimes succeeds in restoring cases to partial and complete working capacity. But its main contributions are in the care of hopeless cases and rendering them harmless to others.

"In most states the laws permit each county, or two or more counties combined, to build tuberculosis hospitals. In some states this law is not merely permissive, but is mandatory. In Massachusetts all cities of over 50,000 population are required to provide hospital accommodations independently of the counties in which they are located. In most states there is a charge for those who are able to pay, while in others all treatment and care at state and county tuberculosis hospitals are free. The rich have no difficulty

in finding accommodations in private institutions. The county hospital, whether it be for the treatment of tuberculosis or for any other disease, provides for the very poor, while those who have difficulty in making ends meet under ordinary conditions and who cannot be classed as paupers are the ones for whom it is most difficult to provide." [1]

Dispensaries.—Experience with tuberculosis, as with so many diseases, has emphasized the importance of early diagnosis and treatment. This makes clear the importance of the tuberculosis dispensary, by which term we mean an institution consisting of a laboratory and other diagnostic rooms rather than a place where medicines are dispensed. The establishment of such dispensaries goes back to the latter part of the nineteenth century, since when an increasing number of them have been established by boards of health in our larger cities at places most convenient to the homes of the working classes.

The tuberculosis dispensary serves at least three useful and important purposes in the campaign against this disease. First, it offers opportunities for diagnosis and expert advice; second, it facilitates the sending of patients to hospitals and sanatoria when such disposal is considered necessary; and third, it serves as an educational center where it is possible to advise patients more definitely as to how to take care of themselves and prevent the infection of others. With the development of the dispensary, the nurse has been added to its staff and has proved to be of great usefulness. Not only does she assist the physician in the conduct of the dispensary itself, but she visits the home, induces other members of the family to come to the dispensary, and instructs the family as to the dangers of the disease as well as to the methods of preventing further infection.

(2) *Preventive Measures*

A sharp distinction cannot always be drawn between those measures which are curative and those which are preventive,

[1] VAUGHAN, Vol. I, *op. cit.*, pp. 494-495.

for the by-products of much of our curative work are of great preventive value. The early diagnosis and segregation of active cases, the proper disposal of tuberculous sputum, the education of patients and their families, all a part of the curative program, are also helpful in preventing the spread of the disease. Certain additional measures, however, are directed principally to preventive ends.

The Preventorium.—"The preventorium is an institution designed primarily for the care of children suspected of having tuberculosis or members of families in which tuberculosis exists. Such children are commonly spoken of as 'contacts'—that is, children who are living in a home with a tuberculous patient. The preventorium was designed also for the care of children who were undernourished or underweight for their ages and in whom no definite evidence of disease could be detected. The preventorium is, in fact, a year-round country boarding-school for children, with the expectation that more emphasis is placed upon the physical care of the children, and that children who are evidently ill are not admitted." [1]

The Open-air School.—Of the various provisions made for the prevention of tuberculosis, few are considered more important and satisfactory than the open-air school. The first one opened in this country was in Boston in 1908, and several larger cities quickly followed the example of that city. So impressively was its value demonstrated by these early experiments that today more than 3,000 open-air schools and classes are in existence in the United States. Although differing in requirements for admission, buildings, and management, an open-air school may be defined in general terms as a school building with classrooms out-of-doors, yet protected from wind and weather, to which are admitted children of the same type as are sent to the preventorium. In some cities, where it has not been possible to establish open-air schools, a compromise has been effected by the creation of open-air classes. The results have been entirely satisfactory, and the movement is destined to grow.

[1] WILLIAMS, *op. cit.*, p. 61.

(3) *The Control of Bovine Tuberculosis*

The prevention of tuberculous infection from bovine sources may be affected in either or both of two ways: by using only fresh milk products from tuberculin-tested herds and by pasteurization.

Three satisfactory tests for tuberculous cattle have been developed, and if given to dairy herds several times a year, infected cattle may be identified and eliminated. The economic aspects of such a policy need to be appreciated, however. Of 14,000,000 cattle slaughtered in 1917, almost 4,000,000 were found to be infected. Furthermore, the control of bovine tuberculosis implies a change in the housing conditions of cattle, with a cleaning up of barns and a greater utilization of sunlight.

Milk produced under conditions satisfactory in this respect is on the market today under the name of "certified milk," a term formally adopted by the American Association of Medical Milk Commissions, and legally protected in a number of states. Its price, however, is considered prohibitive by most families. In addition to the factor of price, other difficulties involved in its guaranteed production make pasteurization the most feasible plan.

To pasteurize milk, it is heated to 140° Fahrenheit for a period of twenty minutes, or to 150° for fifteen minutes, and then immediately chilled and kept below 50° until used. This process, when done by the best commercial methods, destroys most of the disease-producing bacteria in milk. Pasteurization of milk was started primarily for the purpose of preventing tuberculous infection of children, and is an illustration of the relation of tuberculosis work to other health work, for it has a definite bearing on diarrheal and other communicable diseases.

(4) *Improvement of Living Conditions*

Since it is evident that tuberculosis is associated inextricably with general living and working conditions, real success in reducing tuberculosis mortality is bound up with their im-

provement. It appears safe to say, on the basis of our present knowledge, that most of the measures which may be expected to reduce tuberculosis in the future are social and economic in character. Without progress in these, the warfare against tuberculosis cannot succeed. "The tuberculosis problem is one which cannot be solved by the medical profession alone. It involves economic, social, and industrial conditions, and the ultimate eradication of this disease must await the more complete and mature development of civilization as a whole." [1]

PROBLEMS OF THE ANTI-TUBERCULOSIS MOVEMENT

We know enough to prevent most tuberculosis. But two difficulties stand in the way of achievement. One is the problem of educating a large mass of the population; the other, the poor man's financial inability to follow the advice given.

The Problem of Popular Education.—Until half a century ago, the ignorance about this disease was as profound as the dread of it was universal. A diagnosis of tuberculosis was considered tantamount to a death-warrant, with the belief that it would be a menace to the family and descendants for years to come. Nor were most of the members of the medical profession any more enlightened. "In spite of the fact that tuberculosis is and always has been one of the leading causes of death in every community, medical students until comparatively recently were being graduated with no knowledge whatever of the disease. I began the study of medicine in 1894 and during the three years I was a student I never heard a single lecture on the subject of tuberculosis, nor was I shown a single example of the disease in the clinic. Fortunately or unfortunately, for myself, I had to acquire the disease some three years after graduation to find out anything about it. And I may add most of the men who have evinced any interest in the disease have been at one time one of its victims." [2]

The medical profession still needs education in the early

[1] VAUGHAN, *op. cit.*, Vol. I, p. 511.
[2] LANDIS, H. R. M., in *Sixteenth Report, Henry Phipps Institute*, pp. 1 and 2.

recognition of the disease. Proof of this may be found in the large number of early cases accepted for army service and passed upon as sound men. Some of the older medical men still resent the idea that tuberculosis is not hereditary. Granted that the disease lacks the clinical interest of many other pathological conditions, it must be apparent to everyone that a disease which is so common in all communities, and one that is responsible for a third of all deaths between the ages of twenty-five and forty-five, must be understood in all its manifestations, if the physician is to serve his community efficiently.

Gradually, however, the idea is gaining ground that tuberculosis is transmissible, curable, and preventive, and during the last two decades increasing efforts have been made by various health and social-welfare organizations and agencies to disseminate the information necessary for its control. Perhaps the majority of intelligent persons today know the fundamental facts about this disease, but to eradicate it completely it will be necessary to spread this knowledge throughout the entire population so as to reach every citizen. Our foreign element must be reached effectively. Undoubtedly the most hopeful opportunity is afforded through the public schools. Since less than half of our children reach the high school, it is apparent that such teaching must be given in the lower grades.

The Economic Problem of Curative Treatment.—The cure of tuberculosis is a slow process, requiring the building up of the body. This means doing the proper things for a long period of time. Two essentials in this process are food and rest. The matter demands usually a cessation of employment. But tuberculosis is a poor man's affliction, and to the poor man cessation of employment means cessation of income. This, then, is the peculiar problem of tuberculosis—that the disease is most apt to develop under the conditions attending poverty, and its cure demands those things which the poor of themselves cannot give. This places the responsibility largely upon society. Society must furnish, then, not only the facilities for adequate treatment, but must make pos-

sible their effective utilization. Over against the assumption of this burden is the traditional one of premature death and inefficiency. In either event, the cost is social. Health is purchasable, and the lack of it costly. Will society invest, or pay?

THE DECLINE OF THE TUBERCULOSIS MORTALITY RATE

Perhaps the most outstanding fact about the tuberculosis problem is the decline in the death rate due to it. This decline has been common to most civilized nations. In England and Wales it has dropped from about 330 per 100,000 in 1860 to 113 in 1920; in Massachusetts, where reliable records have been kept for a longer period than in any other state, the decline has been from more than 450 per 100,000 in 1857 to less than a hundred in 1922. The following table shows the decline since 1879 in the United States.

TABLE I

DEATHS PER 100,000

Year	Tuberculosis (all forms)
1879–1880	326.2
1889–1890	264.4
1899	205.2
1900	201.9
1901	196.9
1902	184.5
1903	188.5
1904	200.7
1905	192.3
1906	180.2
1907	178.5
1908	167.6
1909	160.8
1910	160.3
1911	159.1
1912	149.7
1913	147.9
1914	147.2
1915	146.4
1916	142.1
1917	147.1
1918	150.2
1919	125.6
1920	114.2
1921	99.4
1922	97.0
1923	93.6

The fall in the mortality rate is even more pronounced in our larger cities than it is in the country as a whole. New York, which may be taken as typical, had a rate of 398 for the years 1881-5, of 280 in 1900, and of 103 by 1921.

How far the decline will go, and how rapidly, depend upon circumstances now no longer vague. New Zealand and Australia have attained a rate of 50 per 100,000. Several states in this country have had rates in recent years falling below this figure; in fact, below 40. It is significant to recall here that about ten years ago no less an authority than Dr. Earl Mayo wrote: "If the members of the medical profession were given a free hand to deal with this disease, backed by adequate provision for the care of existing cases, tuberculosis could be practically stamped out within a single generation." [1]

The facts of the decline are clear, but there is a very considerable difference of opinion as to the causes for it. A certain number of enthusiastic health workers have been quick to attribute the decline in the rate to the anti-tuberculosis measures which have been carried on. The attitude and philosophy of this group have been summarized by Dublin in the following words: "Those who hold this view say that the great mass of the population is pretty generally exposed to infection, and that those who break down and become active cases of tuberculosis, and later die, are those who have not had the resistance to localize and control the foci of infection within them. With that thought in mind, the proponents of this view early developed a broad campaign of general education of the population. A knowledge of personal hygiene was widely disseminated in order that individuals might learn how to strengthen their resistance against the development of active symptoms of the disease. This was the keynote of the general campaign against tuberculosis as outlined by this association (the National Tuberculosis Association) when it was founded in 1904.

"The campaign against tuberculosis was accordingly directed toward finding the large number of individuals who had

[1] Mayo, E., in *The Outlook,* December 7, 1912. Quoted by Kelsey, Carl, *The Physical Basis of Society,* D. Appleton & Company, New York, 1916, pp. 138-139.

broken down with the disease, to strengthen their resistance and to make them well again if possible and, second, to prevent their infecting others. That meant, of course, the establishment of such institutions as the tuberculosis clinic, the training of many physicians in the technique of diagnosis, the building of sanatoria for the care of early cases and of other institutions for the more advanced cases, and the segregation of those individuals who have broken down and might become a source of danger to others. I need not enumerate all the activities and agencies which have grown out of this conception of the origin and control of tuberculosis. . . . The campaign against tuberculosis has attempted to make the lot of men and women happier and easier, to improve their personal hygiene, to remove possibilities of gross infection, and to give many individuals a fighting chance to throw off disease which they would not otherwise have in their usual methods of life."[1]

This position has been challenged sharply by another group, which "places great emphasis on the fact that the decline in tuberculosis antedates by many years the development of the tuberculosis campaign as at present understood, going back, in fact, to the early decades of the nineteenth century. Those who support this second view emphasize the all-importance of the genetic, that is, the constitutional, factors. They grant the universality of infection, but they insist that those who break down are a special group whose conditions, in advance, have doomed them to tuberculous disease. They insist, moreover, that the tendency to have tuberculosis is inherited like other physical characteristics, and that observation will discover a distinctly tuberculous stock or phthisical constitution, quite irrespective of the environment, mode of life, or any effort that man might make either to avoid infection or to build up individual resistance.

"A corollary of this explanation has been that hardly any of the decline to which we have called attention could have resulted from the tuberculosis campaign. It is not in the nature of the disease, this group says, to be amenable to the

[1] DUBLIN, *op. cit.*, pp. 4-5.

kinds of treatment that have been given to environmental factors. There is, as you know, a school of biological writers who for many years have labored to show that the tuberculosis campaign, as it has crystallized in official and voluntary agencies, was doomed to failure. In its extreme form as stated by Dr. Given and quoted by Professor Pearl of Johns Hopkins University, the view is expressed that 'there is no evidence that anything that man has done has affected in either one way or another the decline in the mortality of tuberculosis, which has been continuous for nearly three-quarters of a century.' In fact, it has been urged that such effort as has been made is likely to have done more harm than good by encouraging the reproduction of phthisical stocks and thus thwarting the influence of natural selection. The decline in tuberculosis, on this view, is ascribed to the influence of the disease itself as a selective agency in eliminating less fit stocks and thus preventing the reproduction of such individuals." [1]

Both of these views are extreme; both, perhaps, are partially true. The factors in the decline of the tuberculosis mortality rate must be many and varied. Its earlier high fatality has been selective, no doubt. More careful diagnosis in recent years may mean that fewer deaths are attributed to it. Infection seems to be more prevalent, but the disease less fatal, and it is not unlikely that there has been a falling off in the virulence of the tubercle bacillus. Perhaps there is an increased resistance owing to specific immunization of the population. Only the most partisan would deny a place to the anti-tuberculosis campaign among these factors.

SANOCRYSINE

As these pages are being written, Dr. Thorwald Madsen, of Copenhagen, a leader among the scientists of the world, comes to tell of the work of his colleagues in the Serum Institute of that city, in the production of sanocrysine, a salt of gold, which is said to cure tuberculosis. With history all against it, and with a continuous record of years of disap-

[1] *Ibid.*, pp. 5-6.

pointment in announced "cures" for tuberculosis, one naturally is cautious even when its herald is so well-known an authority.

Dr. Haven Emerson, in writing about it, says: "It has been found further that where the infection is recent, where the tubercle bacillus has not yet caused extensive ulceration or buried itself deeply in encapsulating or fibrous tissues, the effect of the chemical is most favorable. In other words, the body may safely be cleared by this chemical cleanser of bacteria when they have just begun their attack. Still other studies show that, once the human body has so successfully resisted the infection as to develop scar tissue surrounding and closing in upon the colonies of bacilli, it is only with difficulty, if at all, that the chemical can reach them and destroy them. . . .

"Certain it is now that a new promising treatment for bacterial infection has been evolved on principles which appear sound theoretically and successful in practice. Whether or not this will prove to be another and perhaps the final needed resource to close our books with tuberculosis, it is certain that even a partial, incomplete, perhaps fractional success, limited to but a few types, stages, or ages of tuberculous patients, will give a renewed impulse and zest to the search for other chemical compounds especially adapted to attack other bacteria which cripple and kill.

"If so very invulnerable a body as the way-cased resistant little tubercle bacillus can be fatally penetrated by a searching solution, without injury to the delicate cells of our own body in the process, may we not hold an honest hope that blood poisoning, infectious heart disease, perhaps even pneumonia, may be attacked with at least as much success and within our time? Here is a chance for chemistry to establish itself as the great savior—as it has so recently been hailed as the great destroyer—of mankind." [1]

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CHAPTER XIII

THE COMMUNICABLE DISEASES—GENERAL CONSIDERATIONS

Having considered the various groups of communicable diseases, with discussion of their nature and the problems involved in specific diseases in each group, it appears advisable at this point to summarize, even at the risk of some repetition, certain general considerations, such as the sources of infection and the modes of transference, with special reference and emphasis upon the social nature of the problems involved in their control.

SOURCES OF INFECTION

Our knowledge of the phenomena of infection, resistance, and immunity makes it clear that while some of these infections may be communicated to the lower animals under experimental conditions, very few diseases are transmitted to them under ordinary conditions. In other words, most of the communicable diseases from which man suffers are specific for man.

The chief source and reservoir of human infection is man himself. In this respect, as in so many others, man is man's greatest foe. This is one of the outstanding facts which has crystallized out of the mass of work in the sanitary sciences during the past two decades, and from the researches upon particular diseases. It is one of the most important advances made in the field of preventive medicine.[1]

The Carrier.—The importance of the fact that man is the chief source of disease germs has been magnified by the discovery that not only sick but healthy persons may carry such organisms and spread disease without having any of the symptoms themselves. Such persons are known as carriers. The

[1] Rosenau, *op. cit.*, pp. 475. ff.

best known illustration of a carrier is in the case of typhoid fever, and reference has been made already to his possible rôle in its distribution. It is now known that carriers play a part in the spread of many of the communicable diseases, and a rather important part in certain particular ones such as poliomyelitis, meningitis, pneumonia, influenza, diphtheria, and Asiatic cholera.

Thus, while modern bacteriological science, with its description of the nature, life, and habits of the disease-producing organisms, has relieved us of much of the fear once entertained in regard to the importance of certain environmental factors as primary causes of disease, it has revealed, on the other hand, new and unsuspected possibilities of danger among our friends and associates through the discovery of the part played by the human carrier.[1]

Discovery of the rôle of the carrier is one of the most important epidemiological facts added to our knowledge in recent years. It has dispelled the mystery which formerly surrounded the numerous infections which arose without previous contact with an obvious case. Furthermore, it has thrown a new light upon the control of the communicable diseases. "With the new facts has come a realization of added difficulties. Carriers can only be detected by painstaking laboratory examinations. When discovered their control is as difficult as it is important. We cannot lightly imprison persons in good health, even though they are a menace to others, especially in the case of bread-winners. In some infections there are so many carriers that it would require military rule to carry out such a plan. Fortunately, in most cases absolute quarantine is not necessary. Sanitary isolation is sufficient. Thus the danger from a typhoid carrier may be neutralized if the person exercises scrupulous and intelligent cleanliness and is not allowed to handle food intended for others. Such a person might well engage as a carpenter, banker, seamstress, etc., without endangering his fellow men.

"The fact that carriers exist in a large number of diseases makes their suppression one of great practical difficulty. The

[1] Winslow, *Man and the Microbe*, pp. 12-13.

cure of carriers is one of the pressing problems in preventive medicine. One hopeful feature of the carrier situation is that their number may be diminished by isolating and diminishing the cases of the corresponding disease. Thus, the number of typhoid carriers falls off sharply as a result of any successful measures directed only against the clinical cases." [1]

Atypical Cases.—Along with the obviously sick and the healthy carrier as sources of danger is the missed or atypical case. It is well known that most diseases vary in intensity. In certain cases, the symptoms are so mild or so different from those usually found that the case is not recognized as such or wholly passes unnoticed. Because unidentified, such persons may mingle freely with people and thus become a prolific source of disease. Such cases are especially frequent in diphtheria, scarlet fever, poliomyelitis, and meningitis.

In referring to scarlet fever, Chapin writes: "The layman and the inexperienced physician are apt to scoff at the suggestion of scarlet fever unless the patient has a high fever and is as red as a lobster. But all who have seen much of this disease know that it is exceedingly common to see cases with a scarcely discernible rash lasting for only a few hours, a rise in temperature of only a degree or two lasting only a few hours also, and the merest trace of sore throat. Sometimes the rash may be entirely absent and even the fever may escape the most careful observation. In institutions and families, such cases, considered doubtful at first, are perhaps entirely neglected, and prove to be the origin of typical symptoms in others. Every health officer will recall many such cases. They are the missed cases which are such a factor in the maintenance of this disease." [2]

THE NEW PUBLIC HEALTH

Discovery of the fact that man is the chief source of disease germs has revolutionized our public health measures. It has created what Hill terms the "new public health." The contrast between the emphasis of public health measures be-

[1] ROSENAU, *op. cit.*, p. 479.

[2] CHAPIN, CHARLES V., *The Sources and Mode of Infection*, John Wiley and Sons. New York City, 1910, p. 79.

fore and after man's importance was discovered and appreciated has been stated by him as follows: "The old public health was concerned with the environment; the new is concerned with the individual. The old sought the sources of infectious disease in the surroundings of man; the new finds them in man himself.

"The old public health sought these sources in the air, in the water, in the earth, in the climate and topography of localities, in the temperature of soils at four and six feet deep, in the rise and fall of ground-waters; it failed because it sought them, very painstakingly and exhaustively, it is true, in every place and in everything where they were not.

"The new public health seeks these sources—and finds them—among those infective persons (or animals) whose excreta or other constituents or body contents enter the bodies of other persons.

"The old public health failed to find the sources of infection; it also failed in most cases to find the routes of transmission. It is true that public water-supplies were detected as at times transmitting infection; but milk was hardly suspected twenty years ago; flies (and other insects), suggested in 1887, were not seriously considered until the Spanish-American War; mouth-spray and hands have only recently been recognized as important. On the other hand, dirty clothes, bad smells, damp cellars, leaky plumbing, dust, foul air, rank vegetation, swamps, stagnant pools, certain soils, smoke, garbage, manure, dead animals—in fact, things physically, sensorially, esthetically, or psychically objectionable, were lumped together as 'unsanitary' without much distinction of 'source' or 'route,' and were regarded as a sort of general 'cause of disease' to be condemned wherever found, 'for fear of epidemics.' . . .

"The old-style 'sanitary inspector' was expected to, and usually did, 'condemn' everything in sight, from the garbage pail at the back door to the plumbing in the bathroom. But disease continued, because he was condemning, as a rule, so far as health was concerned, things largely 'incompetent, irrelevant and immaterial.' What availed it that the garbage

pail was emptied every day or a vent pipe placed on the bath-room waste trap, if the milkman delivered scarlet-fever-infected milk at the door, or an unrecognized case of measles sat next the children at school?

"The wooden knight of *Alice in Wonderland* who carried a mouse trap on horseback because mice might some day infest his horse, while riding so badly that he continually fell off on his head and was as continually in process of being restored to his saddle by kind friends, furnishes the most kindly yet realistic satire on prevailing public-health methods that could well be devised." [1]

MODES OF TRANSFERENCE

The germs causing communicable diseases may take various routes of transference from man to man, or from animal to man. These routes are designated variously as modes of infection, modes of transference, methods of transfer, or modes of transmission. Whatever term is used, it must be distinguished from channels of infection, which refers to the channels by which the infection enters the body, such as the respiratory tract, the digestive tract, or through the skin.

The various modes of transference have been referred to in the preceding discussions of particular diseases. In summarizing them at this point, they may be grouped, for the sake of convenience, under two general heads: (1) direct, and (2) indirect.

Direct Transmission.—This form is perhaps more usually referred to as "contact infection." This term, as used in this connection, does not imply necessarily actual contact between two individuals, but it does assume the quick transfer of fresh infective material. Besides actual contact, the chief methods of transfer are soiled hands, contaminated towels, infected cups, spoons, toys, food, or other objects which have been handled recently by the infected person. Direct transmission includes, of course, "droplet" infection, by which is meant infection by the fine droplets sprayed into the air from the

[1] Hill, H. W., *The New Public Health*. The Macmillan Company, New York, 1916, pp. 8-12.

mouth in speaking, singing, laughing, sneezing, coughing, etc., and then breathed in by other persons close by.

Dr. Charles V. Chapin's convincing study of *The Sources and Modes of Infection,* which appeared in 1910, and which, despite the skepticism with which it was received at first, has become a landmark in the history of public health in America, gives a graphic description of direct transfer by means of saliva. "Not only is the saliva made use of for a great variety of purposes, and numberless articles are for one reason or another placed in the mouth, but, for no reason whatever, and all unconsciously, the fingers are with great frequency raised to the lips or the nose. Who can doubt that if the salivary glands secrete indigo the fingers would continually be stained a deep blue, and who can doubt that if the nasal and oral secretions contain the germs of disease these germs will be almost as constantly found upon the fingers? All successful commerce is reciprocal, and in this universal trade in human saliva the fingers not only bring foreign secretions to the mouth of their owner, but there, exchanging it for his own, distribute the latter to everything that the hand touches. This happens not once, but scores and hundreds of times during the day's round of the individual. The cook spreads his saliva on the muffins and rolls, the waitress infects the glasses and spoons, the moistened fingers of the peddler arrange his fruit, the thumb of the milkman is in his measure, the reader moistens the pages of his book, the conductor his transfer tickets, the 'lady' the fingers of her glove. Everyone is busily engaged in this distribution of saliva, so that the end of each day finds this secretion freely distributed on the doors, window sills, furniture, and playthings in the home, the straps of trolley cars, the rails and counters and desks of shops and public buildings, and, indeed, upon everything that the hands of man touch. What avails it if the pathogens do die quickly? A fresh supply is furnished each day. Besides the moistening of the fingers with saliva and the use of the common drinking cup, the mouth is put to numberless improper uses which may result in the spread of infection. It is used to hold pins, string, pencils, paper, and money. The lips

are used to moisten the pencil, to point the thread for the needle, to wet postage stamps and envelopes. Children 'swap' apples, cakes, and lollipops, while men exchange their pipes and women their hatpins. Sometimes the mother is seen 'cleansing' the face of her child with her saliva-moistened handkerchief, and perhaps the visitor is shortly after invited to kiss the little one." [1]

In all cases, direct transfer results from rather close association with infected persons. The infective germs do not travel far, as a rule, and the danger diminishes inversely as the square of the distance. The diseases in which contact or direct infection plays a dominant rôle are those in which the germs leave the body in the discharges of the mouth and throat. Direct transmission of intestinal and urinary discharges may also take place, usually by means of soiled hands.

Indirect Transmission—When infection is carried from the sick to the well through the medium of water, milk, food, soil, and insects, it is spoken of as indirect transmission. Besides those borne by insects, the chief diseases conveyed indirectly are those in which the germs leave the body through the urinary and intestinal discharges.

Water.—"The principal diseases of man contracted by drinking infected water are typhoid fever, cholera, and dysentery. Water-borne epidemics of these diseases have frequently occurred in the history of the world. It should be remembered that endemic and sporadic cases may also contract their infections through water. The great water-borne tragedies have for a time occupied an exaggerated position. They overshadowed the less dramatic, but more insidious and nevertheless frequent, modes of transmission of infection through other channels, especially 'contacts.' It is only in recent years, since the water supplies of most of our large communities have been very much improved, so that water-borne epidemics have been excluded, that sanitarians have appreciated the quantitative rôle played by water as a medium of convection in distributing pathogenic microörganisms.

It is worthy of note that almost all the large water-borne

[1] CHAPIN, *op. cit.*, pp. 146-148.

outbreaks that have been investigated have been traced to a quick transfer of the infective material from the patient to the victim. Even in Pittsburgh the Typhoid Fever Commission showed that most of the fever there had been due to near-by rather than remote pollution of the river. The greater the distance and the longer the time between the source of the infection and the use of the water, the less are the chances of harm." [1]

Milk.—Milk is a better culture-medium for germs than water, since they not only live but increase in it. Hence we need not be surprised to find that milk is responsible for the transmission of a longer list of diseases than water. The diseases which may be conveyed by milk include tuberculosis, typhoid, paratyphoid, diphtheria, scarlet fever, Malta fever, septic sore throat, and the diarrheal and dysenteric diseases. Ice-cream may be infected and carry the germs just as milk. Sometimes the milk becomes infected as a result of the diseases of an animal, as in the case of tuberculosis, but milk-borne epidemics are due, as a rule, to human sources of infection, at the dairy, in transportation, or in the household. The human carrier of disease germs is particularly dangerous about milk.

Food.—Of foods other than milk, meat has been the most frequent offender in the direct transmission of disease. Most outbreaks caused by meat are due to some form of prepared meat foods, usually meat of the pig or ox, and the infective agent is of the colon-typhoid type. The carrier in the kitchen is a serious menace.

The Soil.—Soil is constantly infected by the discharges of men and animals, and it was suspected formerly of being one of the most important factors in the spread of communicable diseases. We now know that the soil has wonderful powers of purifying itself, that comparatively few disease-producing organisms can live in it, and that practically none of them can grow and multiply there. The chief diseases associated with the soil are tetanus, anthrax, gas gangrene, and

[1] Rosenau, *op. cit.*, fourth edition, p. 1159.

perhaps typhoid. Hookworm, too, is closely associated with the soil.

SOCIAL ASPECTS OF THE PROBLEM OF CONTROL

A knowledge of the nature and particularly of the sources and modes of transference of the communicable diseases must make it clear that their control is a social problem.

A social problem may be defined as a problem which actually or potentially affects large numbers of people in a common way, so that it may best be solved by some measure or measures applied to the problem as a whole rather than by dealing with each individual as an isolated case, or which requires concerted or organized human action.

"In ancient society health was, except in cases of endemics and epidemics, a matter largely within the power of the individual. When he drank water from his own spring and milk from his own cow, ate meat from his own beef or pig, he could protect himself against disease by being clean and killing only healthy animals. Now, when water is carried over hill and dale through many miles of pipe, when his milk is brought from farms hundreds of miles away, and when he gets his meat prepared and canned from packing-houses which send their goods all over the globe—he may become a victim of disease without knowing the reason why." [1]

"The individual is linked up with thousands and millions of other individuals, most of whom he may never see. When people wore mostly homespun, the bacteria of tuberculosis and diphtheria remained in the family, and killed, maybe, every member of it. Society was but little affected. But in the manufacture of clothing in large quantities as carried on today in factories or sweat-shops, disease germs may be carried into hundreds, if not thousands, of homes; because, owing to the minute division of labor, an affected person handling a large number of garments a day may turn hundreds of pieces of clothing into carriers of disease." [2]

Furthermore, recent appreciation of the fact that it is man

[1] Binder, Rudolph M., *Major Social Problems,* Prentice-Hall, Inc., New York, 1920, p. 119.

[2] *Ibid.,* p. 118.

rather than the environment which is the chief source of infection, intensifies that problem.

"The fact that most infections are spread rather directly from man to man brings in the forces of sociology to aid those of preventive medicine. The task of preventive medicine is rendered much more difficult from the fact that most infections depend upon the control of man himself. We ruthlessly wage war against insects or against infected food or water. In other words, we can arbitrarily control our environment to a great extent, but the control of man himself requires the consent of the governed. Thus, it is easier to stamp out yellow fever than to control typhoid fever. It is easier to suppress malaria than syphilis, rabies than influenza, trichinosis than measles. Cattle appear to be mutely thankful when protected by inoculation against blackleg or anthrax, but man rebels against one of the best of all specifics—vaccination against smallpox. The fact that man is the chief source and reservoir of most of his own infections adds greatly to the scope and difficulties of public health work and often makes the prevention of disease dependent upon social and economic changes. In this sense preventive medicine is a very important factor in sociology." [1]

It is apparent that success in the control of communicable disease has been most pronounced in those which are derived from animals or are insect-borne or indirectly transmitted, and least in those in which man is the chief source and which are spread by direct or contact infection. In this fact lies the peculiar problem and the great hope of the modern public health movement. Man may yet learn that he has as much sickness as he deserves and as little as he wills to have.

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[1] Rosenau, *op. cit.*, p. 460.

CHAPTER XIV

THE DEGENERATIVE DISEASES

The communicable diseases have been the objective of public health efforts in the past. The mortality due to them has been, and is being, reduced. Some of them, like plague, cholera, and yellow fever, are now practically unknown in the United States. Smallpox, once the most dreaded of all scourges, is being controlled effectively. Typhoid and diphtheria are rapidly in process of being mastered. The gains in dealing with tuberculosis are noteworthy. Not much progress has been made against some of the respiratory infections, but they are being attacked. On the whole, man is getting the best of the microbe.

This does not mean, however, that our health problem has been solved; it is being changed. The so-called degenerative diseases, particularly characteristic of the older age groups, are now appearing as man's chief foes to life and health. In the *Statistical Bulletin* of the Metropolitan Life Insurance Company for April, 1922, it is pointed out that "there have been marked increases in the death rates for heart disease, Bright's disease, and apoplexy in recent months among the Industrial policyholders of the Metropolitan Life Insurance Company. . . . By March the rate for organic heart disease had reached 168.2 per 100,000, one of the highest figures ever recorded in any one month among Metropolitan Industrial policyholders. . . . It is obvious that the situation with respect to these 'degenerative' diseases, especially heart disease, is becoming more and more grave and that the very serious attention of health authorities to this subject is called for. Heart disease and its related organic disturbances are definitely taking the place of tuberculosis and the infections as leading items in the mortality of the population." These degenerative diseases have been neglected, almost entirely, in our

health program, thus far. It is against them that the efforts of the future must be directed.

STATISTICS OF THE DEGENERATIVE DISEASES

The relative importance and trend of development of the degenerative diseases are shown by the annual reports of mortality statistics in the registration area of the United States. The following table gives the data on some of the more important of these diseases since 1900.

TABLE I

ANNUAL DEATH RATES PER 100,000 POPULATION FOR CERTAIN DISEASES IN REGISTRATION AREA OF THE UNITED STATES

Year	Heart Diseases	Diseases of the Arteries	Cerebral Hemorrhages and Softening of the Brain	Acute Nephritis and Bright's Disease	Diabetes	Total
1900	132.1	6.1	71.5	89.0	9.7	308.4
1901	132.6	6.8	72.2	89.3	10.2	311.1
1902	137.7	8.2	72.0	90.9	10.3	319.1
1903	143.0	8.9	72.0	97.3	11.3	332.5
1904	153.4	10.5	75.2	103.1	12.8	355.0
1905	152.2	12.2	74.7	103.4	12.9	355.4
1906	148.4	13.0	73.1	97.5	12.7	344.7
1907	159.7	15.6	76.1	102.4	13.5	367.3
1908	148.8	17.0	71.7	93.7	13.4	344.6
1909	151.4	20.0	73.9	95.2	13.8	354.3
1910	158.8	21.6	75.7	99.0	14.9	370.0
1911	156.9	23.3	76.4	97.5	14.9	369.0
1912	159.7	25.6	77.4	103.0	15.0	380.7
1913	155.5	25.2	76.4	102.9	15.3	375.3
1914	159.2	22.8	79.4	102.4	16.2	380.0
1915	165.0	23.3	80.8	105.1	17.5	391.7
1916	168.7	24.0	82.9	105.6	17.1	398.3
1917	171.7	25.4	84.5	107.9	17.0	406.5
1918	170.1	23.4	81.3	97.6	15.9	388.3
1919	146.7	22.3	78.6	88.1	14.9	350.6
1920	159.4	22.8	81.9	89.4	16.1	369.6
1921	157.1	21.9	83.6	85.4	16.8	364.8
1922	165.6	22.3	86.0	88.5	18.2	380.6
1923	175.3	22.8	90.5	90.1	17.9	396.6

It will be noted that the diseases included in this table, which are simply the more important of the degenerative dis-

eases, have a combined mortality rate of 396.6 for the year 1923, being the cause of 32.2 per cent of all deaths in the registration area. In the same year, the epidemic, endemic, and infectious diseases were responsible for but 17 per cent of all deaths, with a combined mortality rate of 206.9 per 100,000, and the respiratory diseases for 10.4 per cent of all deaths, with a combined mortality rate of 127.9 per 100,000. Thus these two groups together, comprising the communicable diseases, were responsible for 27 per cent of all deaths in the registration area, their combined mortality rate in 1923 being 334.8.

Comparing 1923 with 1900, the percentage of increase in the total death rate of these degenerative diseases is almost one-fourth, while during the same years the general death rate declined by one-third. Taking the year 1917, which showed the highest point reached by their combined mortality rate, the total rate is almost one-third higher than in 1900, while the general death rate in that year was one-fifth lower than in 1900. Since 1917, the total rate for the degenerative diseases included in the above table has been lower. This, however, must not be interpreted too favorably and as indicating a permanent change in the mortality trend, for the decline probably was the result of a weeding-out process by the high influenza and pneumonia death rate for several of the intervening years.

HEART DISEASE

Diseases of the heart, the most important of the degenerative diseases, are selected for more extended discussion at this point, after which brief consideration will be given to certain outstanding factors in the degenerative diseases taken as a whole.

Heart disease is now the greatest single cause of death in the United States. In 1923 there were 170,033 deaths due to it in the registration area, which included 87.7 per cent of the total estimated population. This is equivalent to a death rate of 175.3 per 100,000 and to 14.3 per cent of all deaths recorded. Tuberculosis has been pushed from its place as

arch-executioner. Each year since 1912 the mortality rate from heart disease has been higher than that from tuberculosis. In 1923, organic heart disease killed nearly three times as many people in New York City as did tuberculosis, more than twice as many as cancer, and more than half again as many as pneumonia.

"To gauge these sinister enemies of the public health," says Dr. Haven Emerson, "you have only to trace the line which shows the downward course of tuberculosis in New York for the past half century and in the registration area for the past twenty years, and contrast it with the trend of heart disease and cancer, rising as the proportion of the population increases who reach those later stretches of life in which these diseases play their major rôles." [1]

For every death from heart disease during a year, it is estimated that there are seventeen patients still alive suffering from it, whereas the comparable ratio in tuberculosis is about seven cases for each death. In any given community the number of persons who need expert medical guidance because of actual or threatened heart disease and its complications now outruns the number of recognizable tuberculosis infections.

Heart disease in a recognizable form interferes with the work, play, or comfort of at least 2,000,000 people in this country today. From 1 to 2 per cent of the children in the elementary schools suffer from heart defects, and a slightly higher proportion of those in high schools. At least 30 of every 1,000 men and women of working age must reckon with heart disease as a disability in their work or pleasure. Ten per cent of the total bed capacity of our general hospitals are used year in and year out for the care of patients with heart disease. Twenty-five per cent of all visits to our city dispensaries are made by heart patients.

Heart disease usually kills by inches. Diphtheria is a matter of days; typhoid of weeks; tuberculosis of years; heart disease may run for decades. A death from heart disease has back of it typically a story of infection in childhood or early adult life, of loss of working power in the most productive

[1] *The Survey*, November 1, 1924, p. 114.

years, of a decade or more of slowly waning strength, leading to invalidism, dependency, and finally to death. No other disease, except perhaps some of the mind, handicaps its victims for self-support so persistently and so long as those of the heart. The task before society is not merely to keep cardiacs alive, but to help them walk the narrow path between dependency and over-exertion; to find work which will mean self-support and the meeting of family responsibilities, without jeopardizing the wage-earner's dearly won hold on life.

The Next Step in the Heart Disease Campaign.—All health workers and physicians now realize the enormous importance of heart disease as a factor in causing disability, dependency, and death. More and more they realize, too, that heart disease is preventable, and that in organized and intelligent effort lies the ultimate solution of this problem.

So far as the preventive aspect is concerned, the campaign against heart disease is in practically the same position as was the anti-tuberculosis movement at its inception some twenty years ago. And, as in that campaign, the very first effort in the prevention of heart disease must be to build up a body of information which will provide checks against misdirected enterprise. At the present time there is no agency or machinery for collecting the facts by means of which the campaign against heart disease can be properly directed. It is just this sort of machinery which is most needed at the present time.

An excellent beginning in this direction has been made in the cardiac clinics in New York City, under the direction of the Association for the Prevention and Relief of Heart Disease. Similar consideration to the facts of this disease, as revealed by systematic records and follow-up visits, needs to be given all over the country, to the end that, on a basis of established fact, the movement against this arch menace may make satisfactory progress.

IMPORTANT FACTORS IN THE DEGENERATIVE DISEASES

There are two facts which are of peculiar significance in the study of the causes of the degenerative diseases, and which

the reader is urged particularly to keep in mind in reading the remainder of this chapter. The first of these is that only in those relatively rare cases where death is accidental and (usually) of a violent type can a single cause be assigned. Disease and death result, as a rule, from the interaction of many causative factors. The second important fact is that many of these causes are spread over a long period of time. There are, as is customarily pointed out, (1) the direct, more immediate, and exciting causes, and (2) the somewhat indirect, remote, predisposing causes, of disease and death. Because the former are usually more obvious and more susceptible of analysis, they are the first to be studied. These are the causes, it will be observed, which have been studied thus far and with such extraordinarily gratifying results. Foundations for the scientific study of the latter group of causes are now being laid. The degenerative diseases, coming in the more advanced years of life, naturally focus attention upon the long-range view and upon the predisposing rather than the direct causes.

It is just this late appearance of the degenerative diseases which complicates so markedly the study of their causes. "Degenerative diseases occur, as a rule, in later life, after the person's inherited constitution has been subjected to many years of conditional influences. The person may have begun life with a constitution of average type, which was gradually undermined by bad social conditions, physical injuries, infectious diseases, chemical poisons, and overwork, a combination that would tend to use up his vital patrimony relatively early and subject him to the danger of a degenerative disease prematurely. On the other hand, if he had been endowed with a very strong and long-lived inheritance, he may live to a ripe old age though engaged in very hard work all of his life and addicted to the excessive use of tobacco and alcohol. Indeed, it is not uncommon to hear of old men of this type attributing their longevity to the use of tobacco, to their numerous toddies, or to the fact that they had worked incessantly. Such claims, of course, are absurd; they live to be octogenarians because of their strong inherited constitutions and in spite of the po-

tentially harmful conditions to which they were subjected. It may be very easy in certain cases to determine the basis (genotypic or paratypic) of a degenerative condition; thus the tendencies to amaurotic family idiocy, Friedreich's ataxia, and Huntington's chorea, are inherited, and it is altogether probable that no environmental conditions, however favorable, would be able to prevent the onset of symptoms at the usual time. On the other hand, the decision as to the actual causes of certain degenerative diseases may be very difficult. A man may come of apparently good stock and in his early life enjoy good health, and yet die in middle age after wasting his patrimony by all sorts of excesses of work and of play. One might say at once that in such a case the environmental factors were responsible for his early death, and so they may have been in large measure; yet, the will to live at a high rate of speed and the ability so to live may be, in many cases at least, inherited characteristics of the nervous system and so to a certain extent beyond control in the absence of proper early training. Since, in the etiology of degenerative diseases in general, the possibilities are as wide as our knowledge of heredity and of environment can be, it is easy to understand how, in the enumeration of environmental factors considered harmful, the same ones may be repeatedly mentioned in connection with different degenerative states, the patient's predisposition (constitutional and conditional) determining the organ system or tissue first affected by the degenerative change." [1]

Heredity

Heredity is a fundamental factor in all forms and aspects of life. No disease can be discussed without an appreciation of its importance; every form of physical deficiency reflects its influence. Man comes into the world with a mechanism which has been supplied to him, and some are inferior to others in constitutional equipment.

The extent to which sub-standard physical conditions are

[1] Barker, L. F., and Spruit, T. P., *The Degenerative Diseases*, Harper & Brothers, New York City, 1925, pp. 12-14.

due to hereditary factors is difficult of determination. Life is complex beyond measure. A good heredity may counteract or be overcome by unfavorable conditions; a poor heredity will, of course, definitely augment them. Moreover, the subject has been placed only recently upon a scientific basis, and it will require careful and prolonged observation to establish the facts.

At one time the hereditary transmission of microbic diseases was believed quite generally, and a large number of such diseases were regarded as transmissible, but the list has been revised and restricted greatly as a result of recent studies. The reappearance of a diseased condition in successive generations does not prove that it is transmitted or that it is transmissible. This mistake has been made with tuberculosis and other infections. We now know that no infectious disease is transmitted hereditarily—for even in the case of syphilis the infective agent is carried in the germ cell as a foreign body. Prenatal infection may and does occur, but this is not an instance of inheritance. The fetus in utero may take smallpox, measles, and other infections, but these instances must be spoken of as congenital rather than inherited. Only those characteristics or their physical bases which are contained in the germinal plasm of the parental sex cells are truly hereditary.

It may well be that heredity will be found to be an important predisposing factor in regard to the organic diseases. It has been shown, for example, that certain races (Irish, British, German, Hungarian) have a relatively high death rate from the organic diseases. Further researches on this point are highly necessary, and, until made, only general statements pointing to its indubitable importance can be made. At any rate, it is important here to remember that "the duration of life, or the time at which natural death of an animal occurs, is determined to a great extent by its inherited physico-chemical constitution. We know, for instance, that the life span of some forms of life is only a few hours, certain insects live for about three months. The horse may live for thirty years or more, and man for seventy to one

hundred years. Within each species there are different strains with different inheritance in respect to the duration of life, and this is of some importance in human beings. . . . It may be said that each species, or each strain, has a certain inherited endowment in this respect and that the use of this endowment depends to a certain extent upon the environmental factors with which the individual comes in contact." [1]

Infection

One of the main causes of physical impairment in general and of the degenerative diseases in particular is general infection. "Of all heart diseases which come under systematic hospital or out-patient care either in public or private practice, from 70 to 90 per cent are due to general infections. That total is made up of 50 to 60 per cent from rheumatic infections, 15 to 20 per cent syphilitic, and 5 to 15 per cent from focal infections, such as those of teeth, sinuses, and the like, or following acute general infections such as scarlet fever, pneumonia, typhoid fever, influenza, or diphtheria. It will be seen that in this first and largest group of heart diseases due to infections, we are dealing with a multitude of primary causes, all of which are definitely preventable by applying our present knowledge of the cause and manner of transmission of bacterial infection. By these infections—the cause of what are known as the organic diseases of the heart—the structure of the valves, the muscle wall or the covering membrane of the heart is so damaged as to impair the effective working of this ceaselessly intermitting pump and reservoir." [2]

Increasing attention is being given in all health work to local infections as a source of serious acute and chronic diseases in many parts of the body. These local pus reservoirs are known as focal infections. In considering this type of infection it is to be noted that they may occur at almost any part along the respiratory or digestive tract; that they may be established in secondary foci, such as the joints, and from these vantage points infect the teeth and tonsils and other

[1] Barker and Sprunt, *op. cit.*, p. 7.
[2] *The Survey, op. cit.*, p. 115.

sites; that they are a cause not only of joint affections, heart disease, kidney trouble, but of a long range of physical impairments and disturbances which are ascribed usually to the ravages of time. Fisk declares[1] that there are more than 130,000 deaths annually in the working age (twenty to sixty years) from the organic conditions largely due to focal infection, and that there are not less than 14,000,000 people in industry showing signs of organic impairment of some degree. It has also been discovered recently that many nervous disorders originate apparently in the same way. In other words, focal infections, with the recent increase in our knowledge of how they affect the body, stand convicted as an outstanding cause of physical impairment, premature aging, and death. If, in addition to this fact, it be borne in mind that it is possible easily to deal successfully with the majority of such infections, there opens up a notable opportunity to increase the productivity, health, and happiness of a large element of the population.

Alcoholic Beverages

The use of alcohol as a beverage presents a problem to man which he has not shown much willingness to face, and somewhat less capacity to cope with. Befuddled thinking and variously motivated propaganda have characterized every turn in social attitudes toward the problem. Questions of fact have been beclouded constantly by prejudices pertaining to social regulation. Various scientific investigations, it is true, have been made of the effects of the use of alcohol. Even among these there has been a tendency, naïvely enough, to consider chiefly the effects of small quantities given under controlled conditions. Obviously, the problem of the use of alcohol is not one of small doses carefully administered, but of its extended and immoderate consumption as a social beverage. There are many substances which are of value when properly used, but which, if taken in large amounts, are undoubtedly deleterious.

[1] Fisk, E. L., *Health Building and Life Extension*. The Macmillan Company, New York City, 1923, pp. 136-7.

Used in excess, alcohol unquestioningly must be ranked as a poison to the human body. What constitutes excess, however, is in part at least a matter of the personal equation involved. "One person may be apparently 'stimulated' by an amount that renders another 'stuporous.' A cirrhosis of the liver may follow comparatively moderate drinking in some cases, though there are heavy topers who may escape any liver injury. It cannot, therefore, be safely predicted what will constitute moderate drinking for one man or excessive drinking for another. The wide distribution of alcohol and tobacco and the temptations that may be associated with their use put these substances in a class by themselves, apart from other drugs. Human beings can undoubtedly 'get along' without either of them, and the human body will, ordinarily, suffer no harm from abstinence." [1] What alcohol does to man is, in other words, an individual matter, complicated by factors of heredity and numerous environmental influences.

"In the opinion of most physicians, the parts chiefly affected by chronic alcoholic poisoning are (1) the nervous system, resulting in muscular tremors, dulled mentality, irritability, forgetfulness, moral delinquencies, impaired judgment, enfeebled will, dementia, insanity; (2) the digestive system, with catarrh of the stomach or chronic gastritis, impaired appetite, constipation, and fatty and cirrhotic liver; (3) the circulatory system, with degenerative changes leading to arterio-sclerosis; (4) the immunity processes of the body in general through which bacterial invasion is combated. There is less unanimity of opinion in regard to its effects upon (5) the kidneys." [2]

In addition to these effects are those upon the germ plasm. "Among the more interesting experiments of this type are those of Stockard and of Pearl, who studied the offspring of alcoholized parents. Both found that the germ cells are injured and that most of them die or the embryo dies soon after development begins. The stronger germ cells survive, but, according to Stockard, there is a great increase of stillbirths

[1] Barker and Sprunt, *op. cit.*, pp. 93-94.
[2] *Ibid.*, p. 94.

and of weak and sickly offspring. Pearl found the chicks of alcoholized parent chickens stronger than those from normal parents and attributed this to the fact that only the sturdiest survived, these only escaping injury. Stockard followed his guinea-pigs through the fourth generation and found that the general injury persisted through two or three generations. Conklin and others have pointed out that in those experiments the animals were subjected to a much greater degree of alcoholic intoxication than is ever the case in man and that this fact must be taken into consideration in applying the results of these experiments to human beings." [1]

The Non-alcoholic Beverages

Civilization has produced three important non-alcoholic beverages—tea, chocolate, and coffee. All three enjoy a world-wide consumption, although not to the same extent in every nation. They were introduced into North America almost simultaneously in the second half of the seventeenth century, and coffee and tea particularly sprang rapidly into the popular favor. Subsequently, there seems to have developed a subtle prejudice against tea, perhaps because of its connection with certain events in our early political experience. At any rate, it is coffee, rather than tea or chocolate, which has become our sovereign drink.

The rise of the United States as a coffee consumer during the last century and a quarter has been marked, until today it stands at its highest point. In 1921, the annual per capita consumption of coffee in the United States was more than twelve pounds, enough for almost 500 cups. This is four times as much as it was a hundred years ago, more than twice as much as in the years immediately following the Civil War, and about 50 per cent more than the average for the twenty years preceding 1897. Since the advent of country-wide prohibition in 1919, about two pounds more of coffee per capita have been consumed annually. Part of this increase doubtless is to be charged to prohibition. The increased con-

[1] Barker and Sprunt, *op. cit.*, pp. 30-31.

sumption of coffee has been in decided contrast to the per capita consumption of tea, which is less than one pound, and less now than a half century ago.[1]

Coffee, tea, and chocolate contain caffein, which is one of the most powerful heart and nerve stimulants employed in medicine. A cup of coffee contains from one and one-half to three grains, a full medicinal dose. It is to be noted, however, that the action of caffein on the circulatory and nervous systems is rather uncertain, hence the drug is not used as much in treating the circulation as formerly. In the roasting of coffee there is developed a volatile oil, caffeol, to which the flavor and aroma are due. Caffeol stimulates the brain, the stomach, and the bowels.

In regard to the physiological effects of the use of coffee, the disagreement of medical authorities is so pronounced and the various efforts to study the effects so confusing and incomplete, that it appears unwise to attempt much by way of generalization. Since neither tea nor coffee has any nutritional value, and both exert a drug effect upon the organism, they must be considered under the caption of poisons. There seems to be substantial agreement that over-indulgence is a fairly common source of danger, raising the pulse, increasing the blood pressure, and resulting in restless sleep. Apparently, the effects vary considerably on the basis of individual idiosyncrasies, a fact which some attempted investigations have failed to consider. Evil effects seem to be rather prone to appear in nervous, sedentary, underfed and debilitated persons. What one wishes particularly to know, especially in the study of old-age disorders, is the effect of the habitual use of these beverages over a long period of time. This is at once the most difficult and most important point to consider. It is rather difficult for one to dismiss the suspicion that there are certain undesirable effects from the long continued, even if moderate, use of any stimulant, always, however, within the limitation of individual predisposition.

[1] Ukers, W. H., "All About Coffee," *The Tea and Coffee Trade Journal Company*, New York, 1922, Chaps. IV and XXII.

Tobacco

The amount of tobacco used annually is prodigious and is increasing rapidly. Its per capita consumption in the United States rose from 1.8 pounds in the years immediately following the Civil War to nearly 7 pounds per annum by the close of the World War. From 1,500,000 to 2,000,000 acres of arable lands are devoted to the cultivation of the tobacco leaf. The most common form of tobacco consumption has come to be the cigarette, introduced in 1876. The production of ready-made cigarettes, which was about 3,500,000,000 in 1905, is now (1925) in excess of 65,000,000,000. In addition, we smoke more than 8,000,000,000 cigars a year. Our annual tobacco bill is close to $2,000,000,000, an amount considerably in excess of that spent for bread.

Although there is an enormous literature on tobacco, there is lacking reliable information regarding its effects, and as yet no authoritative source from which information can be secured. The subject is not unlike that of alcohol twenty years ago. No sensible person will affirm that smoking improves the health, although few perhaps would care to go so far as does Charles B. Towns[1] when he says that the harm done by tobacco is far greater in the aggregate than that from alcohol, cocain, and opium, and that nothing else at the present time is contributing so surely to the degeneration of mankind as is tobacco. It becomes a question, therefore, as to how much injury tobacco does. This, of course, depends upon the individual constitution, the amount of nicotine absorbed, and the general nature of occupation and living.

Certain general effects may be indicated. The dominant characteristic of tobacco is the fact that it heightens blood pressure. A single cigar raises blood pressure for over one hour. The use of tobacco, then, may be regarded as a factor in the increased blood pressure of the present generation and of the consequences following. There often are disturbances of the circulation. This is commonly evidenced by pain about the heart and a feeling of fluttering or beating in this region,

[1] *Habits That Handicap,* The Century Company, New York, 1916.

with shortness of breath on exertion and rapid, irregular pulse. There may be disturbances, too, of the nervous system, with headaches, dizziness, and a tremulous condition of the hands. Various forms of indigestion likewise may be occasioned by excessive smoking, particularly by increasing acidity in the stomach and heartburn. Of particular significance is the increased use of cigarettes. Because they are so mild, they are almost always inhaled. Inhalation increases markedly the effects of nicotine. Furthermore, the cheapness and mildness of cigarettes cause them to be smoked at all available moments. This applies particularly to boys, and more recently to girls.

Drugs

It is human to wish to ease pain and to stimulate ebbing vitality. Ever since the discovery that certain plants had stimulating or narcotic qualities, they have been used for such purposes, at times legitimately, but more frequently as an unnecessary habit. How far back in point of time their use extends is not known, but the problem of the drug habitué has been recognized and dealt with only in the last century.

The important habit-forming drugs are opium, its derivatives, and cocain. The opium derivatives go under the general term of narcotics. Morphine is the chief active principle, and codeine and heroin are the chief derivatives. Codeine is one-eighth the strength of morphine; heroin, three times its strength. Heroin is now regarded as the most pernicious and is coming to be widely used by drug addicts.

It is impossible at the present time to state to what extent drug addiction exists in the United States. No careful survey of the situation has been made, and the estimates made by those most familiar with the facts show considerable variation. Some of them run as high as 2 per cent of the population, some are as low as 80,000. On the one hand there has been the exaggeration of the propagandist and alarmist; on the other hand is the fact that there are many secret and unsuspected users. At any rate, the number is large, far too large, and the problem is a serious one.

What kinds of people become drug addicts? Gillin [1] enumerates four different classes of habitual drug users:

1. The normal person who contracts the habit accidentally and who in his social relations has not lost caste and except to a limited degree is performing his social duties just as any other normal person.

2. The prostitute or other immoral addict who has lived an irregular life and who demands some kind of narcotic to produce a feeling of well-being.

3. The criminal addict, who contracts the habit usually by imitation of his fellow criminals.

4. The psychotic, abnormal by reason of heredity or disease. Many of classes 2 and 3 undoubtedly belong to this group.

The above classification serves to emphasize a point that needs to be remembered. "Don't get the idea," says Thomas S. Blair, chief of the Bureau of Drug Control of the Pennsylvania State Department of Health, "that all drug addicts are abandoned wretches or criminals; they are not, for fully one-half of the addicts registered in my office are reputable people, and quite a proportion of them have a more or less serious disease that was the original cause of the addiction." [2] The use of habit-forming drugs is not restricted to any race, nationality, or class. They vary in age from twelve to seventy-five years. Most students of the problem have remarked, however, upon the youth of many addicts.

Two factors seem to be responsible largely for the continuance and spread of the drug habit. The first of these is association with drug habitués, chiefly in the underworld. "Drug addiction operates like a pestilence through association." [3] "The process of becoming a user of cocain is simple. Usually it is through association with some unscrupulous young man or woman who, like an octopus with tentacles stretched in every direction, waiting for the luckless victim to

[1] Gillin, *op. cit.*, p. 386.

[2] Blair, T. S., "The Truth About Drug Addicts," *Health*, Vol. III, No. 3, p. 58.

[3] Hubbard, S. D., "The New York City Narcotic Clinic," *Department of Health, City of New York, Reprint Series*, No. 87, February, 1920, p. 21.

come within reach, infests dance halls, cabarets, and amusement parks." [1]

The other factor is the palliative treatment of symptoms by physicians not trained in the best medical practice. An easy way for a physician to make money is to prescribe a remedy that will give immediate relief. The drugs alluded to offer this opportunity in many cases. The relief, however, is temporary, and thus the sufferer comes back again and again. In time the drug habit is formed, and the physician has a growing class of people dependent upon him for the drug demanded by the patient. Dr. Blair, of the Pennsylvania State Health Department, is very emphatic in attributing responsibility to certain types of physicians. He reports that, prior to 1920, the most capable two-thirds of the medical profession of that state were using only 10 per cent of the morphine consumed in that state, while the less capable one-third were using 90 per cent of it, most of which went to drug addicts.

It is the general consensus of opinion that prohibition has not increased narcotic drug addiction. The alcoholic and the drug addict represent two entirely different types, and no student familiar with them would possibly mistake one for the other.

Entirely too much of these drugs has been imported into the United States. A total of 628,979 pounds of opium was imported during the year ending June, 1920. By the end of the year, June, 1922, this had been decreased to 135,093 pounds, due to the enforcement by the Narcotic Division of the federal government of the amended Harrison Narcotic Act, which requires the reporting of all narcotic drugs imported, sold in the United States, and exported. During the year 1922-3 the Federal Narcotic Control Board authorized the importation of 136,000 pounds, although such an authority as Alexander Lambert, Professor of Clinical Medicine at Cornell University, declares that only 45,000 pounds are needed for medicinal and scientific purposes. A large part, especially of that used by addicts, is smuggled into the country.

[1] Buchanan, James A., "Drug Peddlers Defy Law," *The Sunday Star*, Washington, D. C., September 10, 1922, quoted from Moore, *op. cit.*, p. 148.

"It is difficult to estimate the economic cost of drug addiction. According to the report of the special federal committee made in 1919, over $61,000,000 was being spent annually by drug addicts. The committee estimated that at least 25 per cent of addicts were not occupied in gainful occupations, which, according to the report, would represent an additional loss of at least $150,000,000 annually. These figures do not include the cost to federal, state, and municipal governments of the suppression and punishment of crime due to drug addiction. The federal government alone appropriated for the fiscal year 1922-3, $750,000 for the enforcement of anti-narcotic laws, which amount has been wholly inadequate." [1]

Patent Medicines

Perhaps another condition favorable to the formation of the drug habit is the practice of self-treatment by patent medicines. The very idea that physical ailments can be cured by taking a drug in itself is conducive to the formation of the habit. This idea probably is "a survival of savagery—an amusing after-echo of the old primitive belief that disease was a mysterious, semi-personal sort of creature, which clutched you, or 'possessed' you, and had to be shaken off or driven out. A patient in convulsions, for instance, would be naïvely but not unnaturally supposed to be struggling in the grasp of some demon; or perhaps an evil spirit was inside trying to get out. Naturally, we eagerly sought some other half-personal, equally mysterious agency like an incantation, the juice of a herb plucked in a certain stage of the moon, or finally a drug, to banish or neutralize this malign possession." [2] It is the naïve acceptance of this ancient belief, apparently, which underlies that self-medication which prevails so extensively. Although but a few drugs are specific for the cure of disease, and less than fifty are necessary for the treatment of disease, thousands of these remedies are made and sold to the public. It is estimated, on the basis of Census Reports

[1] Moore, *op. cit.*, p. 147.

[2] Hutchinson, Woods, *Civilization and Health*, Houghton Mifflin Company, Boston and New York, 1914, p. 38.

on Manufactures, that more than $108,000,000 was spent in 1921 for patent medicines by the people of the United States.

These remedies are either worthless for the purpose they are consumed or positively harmful because of the ingredients they contain. Brief reference to some of the more widely used nostrums will suffice to illustrate this point. Doan's Kidney Pills contain potassium nitrate, a powerful irritant which may do great harm to kidneys that are diseased already. Nuxated Iron, advertised to have "valuable blood, nerve force and tissue-building properties," contains in a single tablet one twenty-fifth of a grain of iron, while the amount of nux vomica is practically negligible. Tanlac, a "tonic and system purifer," contains 15 to 20 per cent of alcohol, 2 per cent of glycerine, with licorice, aloes, or cascara, and gentian present in small quantities, and with a trace of alkaloids. Obviously, it is a cure for nothing, yet in 1922 the business changed hands at a sale price of $2,000.000. Lydia E. Pinkham, who died in 1883, is the name given to a concoction which contains 15 per cent alcohol. Manufacturers of it have been fined for fraudulent advertising. Sanatogen, widely advertised as a nerve food, consists of 95 per cent casein (dried milk curds) and 5 per cent glycerophosphates. A fifth of a pound of beans contain more food energy than a dollar box of Sanatogen.[1]

The patent-medicine business is one of our great American frauds. Its development has been the result of a skillful and persistent exploitation of a people's eagerness to be healthy and well. Advertising has been the chief means utilized in that exploitation. Advertising as we know it today is of rather recent origin. In earlier days, the advertiser was content with notification to people that he was in a position to meet their demands. Modern advertising goes farther and creates the demand, often for things which people were not aware of before. Manufacturers of patent medicines have been quick to seize upon this opportunity, skillfully playing through suggestion upon the fears of the public. Advertising copy has been adapted to the clientele sought. The intelligent

[1] Moore, *op. cit.*, p. 173.

neurotic finds a subtly worded appeal to convince him that a glorified cottage cheese mixture, patented and sold under an imposing trade-mark name, is a recreator of lost health and a specific nerve tonic. To the farmer, a cruder message is carried. "Scare" pictures tell how every passing soreness in the lumbar region is a symptom of incipient Bright's disease, for which kidney pills of a certain variety are an unfailing remedy. The tired housewife is offered an alluring vision of new energy to be derived from some female tonic of vegetable origin. Albeit, with a generous alcoholic content, the immediate effects indeed may be exhilarating. Perhaps the worst feature of this campaign of misrepresentation involves the frightening of youth, whose thoughts are dwelling naturally to a great extent upon sex, with stories of lost manhood.

When John Doe pays a dollar for a bottle of Dr. Quack's Quick Cure, he does not realize that a goodly portion of that dollar has gone to convince him that he is suffering from the disease which the particular concoction is supposed to cure. The least expensive thing about patent medicines is the medicine. Much more goes into advertising, and the newspapers of the country have reaped a fruitful reward from this kind of business. For this reason, a large portion of the daily press have carried these advertisements, and even religious periodicals have been frequent offenders. Occasionally advertisements in the daily press have their humorous aspects, as when testimonials are printed from persons indorsing certain medicines as responsible for their well-being, in the same issue which carries their obituaries. Letter brokers who supply names and testimonials flourish. "Specialists" cited are either dead or quacks. Taken as a whole, the spectacle of an advertisement of a patent nostrum, promising alluring returns in well-being, testified to by persons who have died, containing few and worthless ingredients, is a humorously pathetic commentary upon American life.

Among the first persons to appreciate the extensive harm done by nostrums and quackery were the editors of the *Ladies' Home Journal* and *Collier's Weekly*, who, with the assistance of others, conducted vigorous campaigns to enlighten the

people of the country to the true nature of the business. Later certain of the metropolitan dailies lent their aid, and still more recently the American Medical Association, the Better Business Bureau of the Associated Advertising Clubs of the World, and the federal government through agencies for the enforcement of the Pure Food and Drugs Act, have joined in the campaign. The chief weakness in the federal Act is that while it prohibits the use on bottles of labels which make false claims, it does not prevent the most extravagant advertising in newspapers. It is even permissible under the law to inclose with the bottle a circular claiming far more for the nostrum than does the label. Efforts to control the advertising of nostrums through legislation have met with strong opposition. Moreover, legislation simply changes the lie direct to the lie inferential, as when a "sure cure for falling of the womb" is subsequently "recommended for the treatment of non-surgical cases of weakness and disorders of the female generative organs."

Quacks and nostrums are a grave menace to the health of the American people. Besides the obvious physical effects of alcohol, narcotics, and other habit-forming ingredients contained, they filch millions of dollars out of the pockets of poor people, affording no help to those in need of it, and ultimately discouraging persons about the possibility of help from legitimate sources. The fight against them must continue, with the main reliance upon popular education.

Occupational Poisoning

In the whole field of occupational hygiene, no menace stands out more definitely and distinctly than that of occupational poisoning. The reason for this is to be found not so much in the number of cases affected, but in the obvious nature of the injury. In England, where recognition of the problem is considerably more advanced than in other countries, the Department of Medical Inspection of Factories and Workshops has catalogued more than fifty poison menaces in the industrial field. A recent bulletin (No. 306) of the United

States Bureau of Labor Statistics mentions fifty-two different poisons and calls attention to the fact that this list is by no means complete, as substances the effects of which are similar have been grouped. Thus, all nitro-compounds of benzol have been included under one heading, and the same procedure has been followed in other cases. New dangers are appearing constantly as a result of the continued introduction of new processes. The rapid development in the production of dyestuffs and other chemicals in recent years caused many new forms of poisoning among the workers. Lack of space prevents an enumeration even of these poisons, but the chief ones are lead, arsenic, phosphorus, mercury, and carbon monoxid. Of these lead is the most important.

Lead is the most frequent, most serious, and most insidious of the occupational poisons. It is generally a cumulative poison and the disease is due usually to repeated entry of minute quantities of lead salts into the system. Susceptibility varies considerably in different individuals. Of a number of persons exposed to the same conditions, some are fatally poisoned, others suffer from mild plumbism, and still others escape entirely.

"Painters are the most numerous sufferers from lead poisoning. Workers manufacturing storage batteries and producers of white and red lead are also exposed to serious injury. Lead poisoning is a distinct hazard in over a hundred different occupations. Among the most important of these are the pottery industry, the manufacture of porcelain-enameled sanitary ware and of tiles, painting and color grinding, lead mining and smelting, plumbing and the manufacturing of plumbers' supplies, type founding and setting, linotyping, lead glass manufacturing, glass polishing, the dyeing of yarns and calico printing in the textile trades, enameling of metal plates, file cutting, tinplating, and certain processes in the rubber industry.

"The most important industry using metallic lead is the printing trade. Workers with metallic lead are less liable to poison than those who work with the various salts of lead.

This is due to its relative insolubility and the fact that it does not readily form dust. On the other hand, it is readily 'oxidized' on exposure to the air. It is this property of the metal which may make type metal (a compound of antimony and lead) dangerous to compositors in printing establishments. . . .

"An early sign of lead poisoning is the increased pallor of the face. Other symptoms are a sense of disproportionate weakness after slight exertion, loss of strength, loss of weight, disturbed sleep, and general weakness. Constipation is frequently present and there is pain in the abdomen. Occasionally vomiting occurs. . . . Lead may affect the nervous system, causing weakness of the extensor muscles of the forearms (the so-called 'wrist-drop') and pains about the joints. Characteristic changes may take place in the blood. Severe cases of lead poisoning are characterized by increasing anemia, serious indigestion, lead palsy, and possibly hardening of the arteries. Sometimes in very serious cases the brain is involved, leading to convulsions, a peculiar type of lead insanity, and death."[1]

The protection of the worker from occupational poisoning is an immediate and obvious obligation of industry. Much has been accomplished in recent years, especially through the aid of the United States Public Health Service. Gradually the workmen's compensation laws are placing occupational diseases in the same category as mechanical injuries, and this is proving to be an excellent stimulus in the development of preventive work. The first country to take this step was Great Britain, which in 1906 included six of the commonest occupational maladies in the compensation schedule. This schedule has been expanded three times, until in 1920 no fewer than twenty-eight diseases were made compensable. In this country, Massachusetts first included occupational diseases and poisons in the Compensation Act, and some six or seven states have followed her example.

[1] Frankel, Lee K., *Health of the Worker*, Funk & Wagnalls, New York, 1924, pp. 28-30.

Constipation

Constipation has been spoken of as the great American disease. Examinations of large numbers of people show a prevalence of from 35 to 40 per cent, and in some groups as high as 60 per cent. Whatever the percentage may be, it is a common condition among apparently able-bodied persons. Constipation appears to be growing more common because of the increase of sedentary living in cities and because we eat too little coarse food, such as is still used by the peasantry of many countries. Many writers, therefore, regard it as a form of maladjustment to modern life and civilized diets. Other conducive factors inhering in our civilization are those which make it impossible to attend to nature's needs and at a regular time. Our cities are constructed as though man was anything but an animal, with animal needs, while the pressure of modern life leads persons to consider themselves too busy to attend to such a trifling matter as nature's most imperative requirement.

"It is impossible to say precisely how much harm may be accomplished by habitual constipation, but a large part of known diseases have been attributed by authorities to it. We do know positively that mental depression, physical weakness, and loss of energy, headache, foul tongue, taste, and breath, are often immediate results of constipation. Also that inflammation of the bowels, diarrhea, and piles result from long-continued stagnation of the bowel contents.

"Many of the common abdominal diseases, as gallstones, appendicitis, etc., are thought to originate in chronic constipation by leading medical authorities, while from constant absorption of poisons due to bacterial growth or putrefaction of delayed intestinal contents all kinds of constitutional diseases may arise. The chronic joint troubles known as chronic rheumatism or rheumatic gout, and even hardening of the arteries and premature old age, are commonly believed by noted physicans to be caused by chronic constipation It is an unfortunate fact that we are continually taking one-sided views of all sorts of matters, so that each specialist, medical

or otherwise, is apt to exaggerate his own specialty and attribute to it all possible effects, to the exclusion of all others."[1]

Poor Bodily Habits

This phrase comprehends a variety of factors, the chief of which are dietetic errors and physical indolence.

Dietetic errors include habitual overeating, overflavoring of food, and too highly seasoned foods. Overeating especially is contributory to the degenerative diseases. It is one of the most frequent causes of arteriosclerosis in well-to-do individuals. It works harm in several ways. It leads to overfilling the arteries supplying the abdominal organs, and if these become thickened and narrowed there is apt to be increased blood pressure all over the body. The reason for this is that the abdominal blood vessels form the great natural reservoir, and in a normal condition can hold all of the blood in the body if they are dilated. Overeating of meat is particularly injurious. All forms of flesh food contain certain irritating substances, such as uric acid and its numerous chemical cousins, which were circulating through the flesh of the animal at the instant of death, and which are swallowed along with the meat, and which have the power to raise the blood pressure considerably when eaten in any amount.

The successful man who is driven to his work in a motor-car, is whisked to his office in an elevator, is seated for the most part during business hours, and is returned to his home or club in the same way, may be envied by those less prosperous, but his manner of living is directly contributory to a shortened career. Too little physical exercise, too little sweating, too much of a sedentary life, accompanied by chronic constipation, are all causes of premature old age.

Nor are these habits confined to the well-to-do. Many adults, "leading sedentary lives, whose activities are chiefly mental, who get but little fresh air and outdoor exercise, who eat too much and sleep too little, frequently suffer from circulatory changes. These effects are due in part to the elaboration in the body of poisons which are improperly eliminated

[1] WINSLOW, *op. cit.*, pp. 260-261.

and in part to the lack of the healthy stimulus to heart action which a more active life affords. Excessive physical exertion, particularly if undertaken without a proper course of training, may be the cause of grave damage to the heart."[1]

The Mental Attitude

Everyone is familiar with the results of emotion in causing changes in the blood vessels, as evidenced in sudden pallor or flushing of the face. In one case the heart may be arrested temporarily and the blood vessels of the brain underfilled, as in the case of fainting, or, in the other, the heart may be beating violently and the arteries of the head may be overfilled. In either case, there is over- or under-action of the heart and blood vessels, due to their control by the nervous system. Hence, frequent and continued stimulation of the nervous system, with the consequent disturbance in the normal functioning of the heart and blood vessels, is a prolific source of diseases of the circulatory system. Nervous strain, then, means heart and blood-vessel strain.

Fear is a definite factor in many diseases. Worry is a foe to health. Anxiety is a mental poison which in many ways exerts the same deleterious effect on the body as literal poisons introduced from without. Disappointment, cankering care, and corroding grief all play their part. Eye strain and undue excitement directly raise the blood pressure, the latter being one of the most common causes of high blood pressure. Remorse and moral condemnation are important, too. Condemnation of conscience brings in its wake all the high pressure-breeding influences.

It is a mistake to assume that states of mental disturbance and unrest approaching the pathological type are found only among the congenitally deficient. The war has given us a better appreciation and a more complete understanding of the mechanism of these states, and students are seeing rapidly similar problems in civilian life. Work, worry, hurry, and a high nervous tension are now recognized as a frequently dis-

[1] Hart, T. Stuart, *Taking Care of Your Heart*, Funk & Wagnalls, New York, 1924, p. 23.

posing factor of ill-health or breakdown in all walks of life, including the so-called higher professions."[1]

Once the effects upon health of the mental factor are appreciated, the menace of much in present-day living becomes apparent. Modern society exists in a state of more or less constant tension. The dominant feature of our civilization is the city, which is above all a place of tremendous stimulation. Sights, sounds, and the activities of thousands bombard the senses and the mind. No other class of realities is so stimulating to man as the activities of his fellows. The city streets, with their shop windows and their throngs, are a perpetual world's fair. Modern traffic makes the mere crossing of the street an adventure. Noise and hustle and thrills abound, and without end. Almost every form of amusement is constructed with a view of thrilling, startling, and exciting the spectator. The inordinate craving to be hurled through space at increasingly perilous speed is likewise a cause and a result of our high-pressure régime.

The following quotation, written for and in the style of, a Sunday newspaper, describes, nevertheless, all too well certain features in our modern life which are of tremendous significance in connection with the degenerative diseases.

"Too many joyrides, too many kisses, too many cocktails, too many thrills, too much speed—and the result is a nation of broken hearts, not sentimentally but physiologically.

"Giddy grandmothers trying to be flippant little flappers; frivolous fathers and mothers turning backward the hands of the clock of time against all the laws of nature; little children leaping overnight from adolescence to maturity in the superheated whirl of the modern social wheel—youth and age foolishly and paradoxically seeking to exchange places.

"Bob-haired, short-skirted girls saturated in cigarette smoke; sleek-haired, pasty-faced lounge lizards toting death-dealing hip-pocket flasks; young married women—and mothers of the new race—philandering from one secret flirtation to another; husbands—and fathers of the next generation—maintaining

[1] SADLER, W. S., *Race Decadence*, A. C. McClurg & Co., Chicago, 1922, pp. 161-162.

clandestine *ménages* for mistresses who bear them children born out of wedlock; grandmas and grandpas, who ought to be home in bed, toddling and shimmying in the three-o'clock waltz—everywhere excesses out of proportion to the normal rules of life.

"Boys and girls fed up day and night with erotic love scenes pictured on the movie screen; whirling away in midnight motors to the hidden tryst and the petting party; rearing and tearing from one *soirée* to another in one continual round of pleasurable pursuits—dash, flash, crash—and then smash!

"Paint and powder, dance and dine, 'give' and 'take,' hooch and hilarity, kisses with a 'kick' in them, monkey glands to bolster up fast-fading vitality, drugs to allay headaches 'the morning after,' and then off again in search of another round of new and more startling sensations—all the time a grinding wear and tear upon the delicate mechanism of that master machine more wonderful than any contrivance of steel and iron the inventive genius of mankind has conceived and wrought, the human body.

"Is it any wonder the human body cannot stand the pace of modern life? Why amazement over the revelation the old folks are dying of anemia and the young folks of organic heart troubles? Should there be any consternation resultant from study of facts and figures demonstrating beyond all doubt the human heart is literally pounding itself to pieces at an early age in the hectic and curtailed journey from the cradle to the grave?

"Hearts are always trump, not alone sweethearts, but the pulsating, throbbing hearts of flesh that pump the life-sustaining blood through all the veins and arteries of the physical body. Yet in this day hearts are being trumped by that devastating all-dominant 'joker,' the great god jazz, who pockets all the prizes on the table and 'freezes out' avaricious, joy-crazy players early in the game, banishing them to premature death.

"Talk with any reputable physician who has his nose above the grind of everyday practice and he will tell you the story of the deterioration of the human heart—hearts of flesh and

blood unable to stand the terrific strain of the abnormal pressure they are put to in these days of fast and furious living. Once upon a time tuberculosis—the 'white plague'—and cancer were the dread scourges most vigorously combated by medical science. They still hold forth on a ravaging scale, but ranked ahead of them as the cause of most deaths in this country are cardiac diseases: pericarditis, endocarditis, myocarditis and other kindred heart ailments." [1]

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CHAPTER XV

NUTRITION AND HEALTH

The World War, with its large-scale inventory of the physical condition of a substantial part of the population of Europe and America, served to call attention to problems of health other than those connected with the communicable diseases. At the same time, marked interference with the amount and variety of food supplies among the civilian population, particularly among the Central Powers, led to serious physical results. The coincidence of these two groups of facts led to a new interest in, and a profound appreciation of, the importance of food as a factor in physical well-being.

THE SCIENCE OF NUTRITION

The process by which the body obtains nourishment has been under dispute since the time of Hippocrates. The modern era of the science of nutrition may be said to have been introduced by the famous French scientist, Lavoisier, in 1780. Not much was accomplished, however, prior to the middle of the nineteenth century. Since that time, a galaxy of scientific worthies, including Voit, Pettenhofer, Rubner, Atwater, Lusk, Benedict, Osborne, McCollum, and many others, have pushed back gradually the boundaries of our understanding and laid the foundations of a genuine scientific approach. Some of the ablest investigators of the present generation are devoting their efforts to the development of a science of nutrition, confident that it is but in its infancy. As the establishment of Pasteur's germ theory revolutionized the conception of disease, so, in their judgment, the science of nutrition will revolutionize its treatment and prevention.

Factors in Its Development.—Progress in the development of a science of nutrition has been attained on the basis of two factors,

1. Our understanding of nutrition has progressed hand in hand with the science of chemistry. "Chemical science has given us the clue to an understanding of the nature of foodstuffs and the changes which take place in digestion, as well as an appreciation of some of the secrets of the metabolic processes which take place within the tissues of the body. Chemistry will continue as time goes on to aid in extending our knowledge of the finer processes of physiology." [1]

Thirty years ago it was believed rather confidently that the chemist had solved our food problems. "He had determined the amount of water in every organ and tissue in man's body; had estimated the amount of moisture in our foods; had calculated the quantity of fluid that the average man should consume each day; had determined the amount of water leaving the body daily through the kidneys, bowels, skin, and lungs. He had made both qualitative and quantitative determinations of the inorganic constituents of bone, muscle, and brain; had estimated the amount of each of these substances in our foods and had shown how they are absorbed and assimilated. He had proved that all carbohydrates, so far as they serve as foods, are converted into sugars in the alimentary canal, absorbed through the hepatic circulation, deposited in the liver as glycogens, again converted into sugar and distributed through the body at need, again deposited in muscle and other tissue as glycogen, and finally burned into carbonic acid and water, thus supplying the animal machine with energy. He had broken up the neutral fats into glycerin and fatty acids; had shown how a like process is accomplished in digestion; how the digested fats are absorbed, distributed through the body, and finally burned, with a further supply of energy. He had taken the proteins of our tissues and of our foods to pieces; had shown that the proteins are composed of amino acids; had determined the amount of amino acid in the various proteins of the human body and calculated the daily supply of amino acid needed to keep the body in health. He had constructed long tables showing the percentages of water,

[1] McCollum, E. V., *The Newer Knowledge of Nutrition,* The Macmillan Company, New York, revised edition, 1922, p. 1.

inorganic salts, carbohydrates, fats, and proteins in foods. He had calculated the amount of each food principle essential to the daily diet in order to supply the machine with sufficient energy to enable it to accomplish its work, and with sufficient constructive material to repair any wear and waste in the machine itself." [1] All these and many more things the chemist had done. What was there remaining for him to do?

2. The sciences of medicine and surgery are built upon experience and knowledge gained through animal experimentation. Most of our knowledge of the rôle which bacteria play in the production of disease has been gained through studies on the lower animals. Protective serums could never have been discovered except by such procedure. Inspired by the examples in other fields, the chemist applied his food principles to the feeding of animals. Strange to say, his animals would not live on the basis of these, although there was lacking nothing in the quality and quantity of the diet which he devised in accordance with his principles.

After the disconcerting results of these earlier applications, McCollum and others, in 1906, began making careful experiments upon cattle to determine the effect of simple diets of different kinds. The results obtained were very striking, but the cost of continued experiments with cattle was prohibitive, and the rat was substituted. The experience gained confirmed the conviction that the only way in which the problems of nutrition ever could be solved was to work out the problems of successful feeding with simplified diets, subsequently to progress to more complex diets. In the last two decades this has been the method most emphasized, and it is safe to say that more progress has been made in the study of nutrition, from the theoretical as well as the practical standpoint, by a systematic feeding of simplified diets to animals, than by means of chemical studies. The results thus obtained are interpreted on the basis of the ability or inability of animals to develop as the diets are modified.

Successive Emphases.—With the help of these methods the science of nutrition has emerged from its simple beginnings

[1] VAUGHAN, *op. cit.*, Vol. II, p. 20.

into a complex problem of great intricacies. It is possible to observe several rather well-defined stages in its development on the basis of the particular thing emphasized.

1. Under the earlier influence of the more purely chemical approach, attention was directed to the chemical composition of foods, and stress was placed accordingly upon the importance of proteins, carbohydrates, and fats in the diet. To these was added later the necessity of certain inorganic salts.

The proteins (meat, milk, eggs, peas, beans, etc.) build tissue and repair waste; to a less extent, they serve as fuel to yield energy in the forms of heat and muscular power. Carbohydrates are the starchy foods, represented by the cereals, the tubers, and the sugars. The fats or oily foods include butter, olive oil, cotton seed, the fat of meat, the oil of nuts and seeds, etc. All vegetables contain more or less oily substances. Both carbohydrates and fats serve as fuel to yield energy. The chief worth of fat lies in the ease with which it is stored, especially in the connective tissues.

"Professor Atwater, who represented the most advanced thought of his time, wrote, in 1895, his *Chemistry and Economy of Food,* which clearly reflects his view that if we knew the composition of all the foodstuffs entering the human diet, as determined by chemical analysis, their digestibility and energy values, and the energy requirements of an individual at rest and when doing various kinds of work, we should have all the necessary data to enable us to plan a highly satisfactory nutritive regimen." [1] Many dietaries were studied, among various occupational groups, and published for the most part in bulletins of the United States Department of Agriculture. These studies represent an epoch in the development of the science of nutrition.

We have learned since, however, that the proteins are not all of equal food value, that quality as well as quantity is important, that the difference in the nutritive values depends on the fact that the proteins yield varying amounts of amino acids or digestion products which determine the efficiency of transformation of food proteins into tissue proteins. On the

[1] McCollum, *op. cit.*, p. 49.

basis of our present understanding, the emphasis is in the direction of a lower protein diet. One of the lessons derived from the war was the fact that throughout the whole civilized world there was an excessive consumption of meat. There appears to be abundant evidence that if there is a fairly liberal consumption of milk, milk products, cereals, bread and fruits, the meat in the diet may be reduced to a minimum without injury to health. Denmark, Norway, and Sweden, with a very low meat consumption, have also very low death rates. The per capita consumption of meat in Denmark is less than half that in the United States.

Reference has been made to the importance of organic salts. Mineral matter, or ash, performs an important service in forming bone and assisting in digestion and metabolism. "Foods richest in mineral elements, such as calcium, phosphorus, and iron, are milk, vegetables, whole-grain cereals, and fruit. Without these four foods we can hardly expect the best kind of growth and health. They not only form the bulk of bones and teeth, but they help in the process of digestion, they help to keep the heart beating properly, they help in breathing, in the circulation of the blood, and in the elimination of poisonous material from the body.

"We often fail to appreciate that a lack of these mineral elements stands between us and health. They are very essential. Many a tonic is given to supply the elements that should have been in foods. Every diet should contain plenty of milk, vegetables, fruit and whole-grain bread and cereals to provide the mineral elements.

"Milk is the chief source of calcium (or lime as it is sometimes referred to). Unless milk (cheese may be used by adults) is abundant, there is grave danger of calcium deficiency. Doubtless many unaccounted-for headaches, fatigue, nervousness, pains, ailments of all kinds are due to insufficient calcium." [1]

2. The caloric value of food was the next to be emphasized. A calorie is the amount of heat required to raise a kilogram of

[1] Gillett, L. H., *Food for Health's Sake*, Funk & Wagnalls, New York, 1924, pp. 7-8.

water one degree Centigrade. In the case of a man of average weight doing a moderate amount of muscular work, a daily diet of from 3,300 to 3,500 calories is deemed sufficient—400 calories, protein; 900 calories, fat; and 2,000 calories, carbohydrates. For the requirements of heavy work, this should be increased to 4,000 or more. During the World War the United States ration in the field was 4,600 calories, most of the increase being that of fats.

It is not sufficient to know merely the amount and caloric value of the coal led to a furnace. We must know how much of the heat generated has been utilized. It is the same with food. Calorie for calorie, foods are not interchangeable so far as nutritive value is concerned. Early studies in nutrition based almost entirely upon the principles of caloric values and balancing of rations, while productive of a great amount of good in preventing food excesses and deficiencies, were obviously incomplete. Further experimentation showed that many considerations other than fuel value make up a balanced ration. The most recent tendency, therefore, except in institutional work, is to draw away from a rigid calculation of dietaries based on food requirements as judged by caloric values and to depend more upon maintenance of normal growth and body weight. Biologic studies indicate the importance of other dietary factors which condition the utilization of foods and determine growth and nutrition.

3. These accessory factors in the diet necessary for growth and metabolism have been called vitamins, and it is these which are now being emphasized in dietary studies. The term, like a great many others selected prematurely by investigators, has turned out, with increasing knowledge, to be quite unsatisfactory. The sanction of usage has fixed it, however, in our medical and scientific literature.

Little can as yet be told about them. Their chemical nature is not known. They cannot be elaborated or stored by man or other animals. There may be a large number of vitamins, but only a few have been identified thus far. Those known are as follows:

Fat-soluble A "is most abundant in certain animal fats, of which the best are butter and cod-liver oil, and in the fat-rich yolk of eggs; it is found in considerable quantity in glandular organs like the liver and kidney, in the embryo of wheat and presumably other seeds, in fresh green vegetables like cabbage, lettuce and spinach, and of course in cream, whole milk, and cheese prepared from the same; there are appreciable amounts in whole-meal bread, in peas and beans, in carrots and nuts; it is absent or practically absent from vegetable oils, such as olive and cotton-seed, from lard and the hydrogenated fats sold as lard substitutes, from meat, white bread, potatoes, oranges and yeast. The best way of insuring its consumption in sufficient quantity is to see that the diet includes whole milk, butter, eggs, and fresh vegetables. Skimmed milk, and condensed milk or milk powders from the same, are almost useless in this respect." [1]

This vitamin is soluble in fat, hence called fat soluble A. Whenever it has been removed from the food given to rats, the rats have failed to grow. When foods rich in it are given to children, they grow exceptionally well. It is entirely possible, then, that children not growing normally and in whom no other cause for undernutrition can be found, are not getting enough of the foods containing vitamin A. It also helps to build up a good resistance to disease.

Water-soluble B is widely distributed among natural foodstuffs and can be isolated in a concentrated, but not in a pure, form, by extraction with alcohol or water. Its richest sources are in yeast and in the germs of wheat and other cereals; there are relatively large quantities in peas, bran, nuts, and the glandular organs of animals; it is present in milk, egg yolk, whole wheat, fresh vegetables, meat, potatoes, and bananas; the only common foods lacking in it are polished rice, the sugar and starches, and the fats and oils from both animal and vegetable sources. Because of its wide distribution, wherever the diet is at all varied, its supply is believed to be adequate enough.

[1] Fitzgerald, *op. cit.*, p. 398.

Vitamin B aids in the control of the nervous system and in overcoming a feeling of fatigue. Its importance was first discovered when apparently paralyzed pigeons were made well by giving them the polishings or outside coating from rice. Since then it has been found to make some children grow where they seemed to be below weight.

Water-soluble C is most plentifully furnished by the juices of certain fruits and vegetables, such as oranges, cabbage, and tomatoes. It is abundant too in germinating seeds, and there is some in potatoes, meat, and milk. The dry cereals, eggs, and yeast are lacking in it altogether. Fresh fruits and vegetables are the best source of it. It is to be noted that cooked and dried foods have in great measure lost their peculiar dietary properties with respect to this substance. This vitamin is useful in keeping us well. It prevents scurvy and its symptoms which may be present without developing into the disease.

Vitamin D has been discovered recently by McCollum, the absence of which favors the development of rickets. The two best sources of this vitamin are cod-liver oil and egg yolk.

FUNDAMENTAL DIETARY REQUIREMENTS

The fundamental requirements of a diet, based on our present knowledge, may be said to be as follows:

1. Protein sufficient in amount and in quality to furnish the new material required for growth, and to replace the wear and tear upon the tissues.
2. Energy, in quantity adequate to balance that expended through heat, work, and in other forms.
3. Mineral constituents adequate for the construction of bones and other tissues, and to replace the daily loss of inorganic elements in the excreta.
4. An irreducible minimum of the accessory food factors known as vitamins, to enable utilization of foods for growth and development.

The foods most important for each of these are summarized below:

Proteins	Energy	Mineral Elements	Vitamins
Milk	Fats	Milk	Milk
Meat	Oils	Eggs	Eggs
Legumes	Grain products	Vegetables	Vegetables
Nuts	Milk	Fruit	Fruit
Whole-grain cereals		Whole-grain cereals	Whole-grain cereals
Cheese			
Fish			
Eggs			

It is apparent that a balanced diet depends upon many factors, some of which are exceedingly complex. Safety lies in a generous diet, as varied as possible. A wide variety provides a factor of safety. Growing children particularly need a wide variety of foods.

DIET AND HEALTH

Twenty years ago, a discussion of the effects of diet upon health would have dealt mainly with food poisoning and infection. There are a number of possibilities of this kind. Foods may be naturally poisonous, like certain mushrooms; they may contain animal parasites, like trichina and tapeworms; they may contain disease-producing bacteria, such as those causing typhoid and tuberculosis; toxins may develop in food as a result of bacterial activity, botulism being an example of this; there are the putrefactive poisons, decomposed products of proteins, leading to what is misnamed "ptomaine poisoning," and accidental poisons which find their way into food.

It should be added in this connection that certain persons have idiosyncrasies for certain particular foods. Some people develop a rash as the result of eating strawberries; others are sensitive to egg white; others cannot eat tomatoes. Such difficulties occur commonly with sea foods. There are many cases of hyper-sensitiveness to proteins. The resulting symptoms are alarming but seldom fatal, and decrease in severity with repetition.

The danger from food poisoning has much diminished in recent years. Our pure-food laws are fairly effective, and our food supply is therefore policed with fair efficiency. The food industries, too, have advanced steadily their own sanitary standards and systems of control. As a result, the purchaser

today may feel reasonably sure that the food he buys contains nothing directly injurious to his health.

With the decrease of this danger has come a better knowledge of nutrition processes and requirements. As a result the center of gravity has shifted from sanitation to nutrition. Thus our chief concern in the relationship of diet to health comes to be with the so-called deficiency diseases and the relation of food to susceptibility to disease in general.

THE DEFICIENCY DISEASES

Beriberi.—This is the best-known illustration of a deficiency disease. It is a specific form of multiple neuritis, characterized clinically by an atrophic paralysis of the legs and arms, dropsy and affection of the heart. The disease is endemic throughout the Malay Archipelago, the Philippines, China, Japan, and Brazil. It has also been encountered in Newfoundland, Labrador, the crews of ships on long voyages, asylums, and prisons.

Beriberi is now known to be due to a diet deficient in Water-soluble B. In all places where it prevails people live on a monotonous and one-sided diet, made up largely of polished rice. There is abundant evidence on this point, and the disease is now recognized as being entirely preventable through corrections of diet. It has been eliminated almost entirely from the Philippine native scouts by a change in diet.

Xerophthalmia.—The relation of nutrition to diseases of the eyes has concerned in late years a number of investigators and observers. Xerophthalmia is an eye disease in which the eyes become swollen, so that they can be opened with difficulty; the corea becomes inflamed, and ultimately blindness may result. It has been found most frequently in children under two years of age, and outbreaks have been reported in Japan, Denmark, and elsewhere. The disease is the specific result of a deficiency of Fat-soluble A, and can be produced experimentally in rats by feeding them a diet lacking in this respect.

Scurvy.—Scurvy has long been the disease most definitely attributed to unsatisfactory diet. For centuries it was the

particular scourge of soldiers and sailors, and it has been only within the last several decades that better rationing has removed its menace. During the World War there were a number of cases of it among soldiers and prisoners, especially on the Eastern front, and subsequently it prevailed extensively in the Russian red army. There have been endemics of it, too, among civilian populations, as in Russia, England, and among foreigners in Pennsylvania mining towns. Until a generation ago it was very common among miserably fed convicts.

The chief manifestations of scurvy are swelling and bleeding of the gums, multiple hemorrhages, anemia and progressive weakness. The hemorrhages occur in almost every part of the body, beneath the skin and in the bones, and lead at times to ulceration or necrosis. As the body weakens the intellectual functions become depressed. In the last stages delirium follows, and unless not relieved by appropriate treatment, death ensues. There is an infantile scurvy, known as Barlow's disease, which occurs in babies between the sixth and tenth month. Every baby raised on proprietary foods, without any fresh or "live" food, is menaced by this disease. All babies not breast-nursed should have orange juice, tomato juice, or some other anti-scorbutic. This infantile form of scurvy is often mistaken for rheumatism or infantile paralysis.

Various explanations for scurvy have been advanced, and some still persist. It appears likely, however, that it is due to a deficiency in the diet of a specific food factor of the vitamin type, and is attributed usually to the lack of Water-soluble C. Accordingly, its prevention demands fresh foods such as cabbage, lettuce, onions, apples, spinach, and juice of oranges or lemons or tomatoes.

Pellagra is a chronic, wasting disease, with marked skin lesions, digestive disturbances, and nervous abnormalities such as anxiety neuroses, delirium, and insanity. It is a recurrent disease, most marked in the spring of the year, largely rural in incidence, and rather more prevalent among women than men. The disease obtains mostly in northern and central

Italy, Rumania, Spain, South America, and southern United States. In 1917 Goldberger estimated that fully 125,000 persons were attacked with pellagra in the states south of the Potomac and Ohio rivers. It occurs sporadically in many other parts of the world.

"It was believed by many scientists for some years that pellagra was due to the use of spoiled Indian corn; others believed that it was a communicable infection due to unsanitary methods of sewage disposal. Joseph Goldberger of the United States Public Health Service began working on the problem in 1914, and by 1922 had presented data showing to the satisfaction of most interested scientists that pellagra is due primarily to an improper diet, probably to a faulty quality of the protein supply. Goldberger and his associates have produced the disease in man (convict volunteers) by the administration of a diet of a type that was found associated with pellagra, and prevented it from recurring in certain persons in Southern institutions through the use of a well-balanced diet. Goldberger hopes to discover the particular amino acid, the absence of which causes pellagra. His work up to 1922, however, definitely showed that the prevention of pellagra might be brought about throughout the South through the use of a proper diet, particularly as regards a more liberal inclusion of milk, eggs, and lean flesh foods." [1]

Pellagra prevails especially among the poor, and particularly among the poor who are ignorant of dietary requirements. In a study of cotton-mill villages during 1916 Goldberger found that in general pellagra incidence varied inversely according to family income. Thus it is evident that educational measures and economic and social improvement constitute the essentials in a program for its prevention. Prosperity spells prophylaxis in this disease as in others. The state departments of health in a half a dozen Southern states have distributed pamphlets on pellagra, but nowhere in the South has any adequate program of preventive measures been undertaken.

[1] Moore, *op. cit.*, p. 158.

Rickets.—"There are probably no conditions which contribute more to physical inferiority in man than defects in skeletal development. Most important among these is the result of a syndrome designated as rickets." [1] Rickets is a world scourge, presenting a national public health problem in every country. It is a disease of infancy, particularly of the first two or three years of life. It may appear as late as the fifth or sixth year. Since the World War, "late rickets" has been somewhat common among the children in central Europe.

The chief characteristics of rickets are alterations in the growth of the bones. They become enlarged at the extremities, and soft, so that they bend under pressure, thus leading to various distortions. There is defective ossification of the skull, and various deformities of the head, spine, limbs, and chest result. The teeth appear late, in unusual order, and decay early. It should be emphasized, however, that while the diagnosis of rickets rests mainly upon skeletal manifestations, it is a disease which involves the whole body. Affected children suffer from digestive and nervous disturbances. They sleep poorly. The muscles are flabby, wasted, and weak. The ligaments are loose and lax. The children perspire freely, especially about the head. There is often a secondary anemia.[2] Apparently, then, we are confronted in the case of rickets with a chronic disorder, whose development is a slow and complex pathologic process, the disturbance of metabolism affecting nearly all of the structures and organs of the body.

The most diverse views have been advanced regarding the causes of this disease—heredity, syphilis, tuberculosis, lack of sunlight, hygiene, etc. In recent years, two schools of investigators are dominating the field. One attributes it to errors in the diet, although admitting that other unfavorable living conditions play a rôle. The other school emphasizes hygienic conditions, particularly lack of sunlight, as the chief factor in the etiology of the disease. The former school seems to be having the better of the argument, although apparently rickets

[1] McCollum, *op. cit.*, p. 292.
[2] *Ibid.*, p. 295.

is not a deficiency disease in the same sense as beriberi or scurvy, which result from specific starvation of a particular factor. The most recent contribution to the study of rickets is the identification by McCollum of a fourth vitamin which prevents rickets. Cod-liver oil is a specific preventive and cure.

Simple Goiter.—A number of investigations have served to call attention to the extent and prevalence of simple goiter. It is particularly prevalent in the extreme Northwest, and in the region of the Great Lakes. In its origin, simple goiter results from an iodine deficiency, due to the fact that the amount of iodine furnished by the food and drink are inadequate, with the result that the thyroid gland becomes enlarged.

It has been shown recently that milk furnishes iodine in significant quantities, and as it has been found also that a diet consisting essentially of grains induces goiter in rats, it becomes probable that milk was the chief source from which the rat family obtained iodine during their long history of subsistence upon a simple and monotonous, but evidently adequate, diet. From present indications, it appears probable that milk and green vegetables, classified by McCollum as the protective foods because of their calcium and vitamin content, will also prove of value as dietary sources of iodine.

It is not to be assumed from what has just been said that an exclusive dependence upon any food or foods for protection from goiter in highly goiterous regions is satisfactory. In such regions, the deficiency of iodine in soil and water may be such that no locally grown food will suffice to meet the iodine requirement. There are, however, wide areas which are neither highly goiterous nor wholly immune, in which the amount of iodine supplied by ordinary food and drink is near to the border line of adequacy; and in such regions it may well be that the choice of food with reference to its iodine content (when this shall have been studied) will suffice to turn the scale from danger to safety. "The prevention of goiter is thus a nutritional problem whose immediate solution

depends not so much upon detailed knowledge of food values as upon the use of methods which lie largely in the province of health officers." [1]

Simple goiter may be cured if not too far advanced by the administration of small doses of sodium iodid. This drug is now being administered by the school authorities in certain parts of the country.

The diseases just described are those which have long been regarded as deficiency diseases. They are the ones best known to us, and result from rather outstanding and usually single deficiencies in the diet. It is entirely likely that others will be recognized, and in the future development of the science of nutrition many nutritional disorders now classed under the general term of malnutrition will be found to be clinical entities of specific origin.

Moreover, another aspect of these diseases requires more consideration than has been given to it. The deficiency diseases all have a certain latent period, in which the disease exists but is not yet evident. The latent period for beriberi is about ninety days, for scurvy from four to eight months. It is self-evident that during this period the future patient suffers from a general impairment of health. Such a condition seems highly important from the standpoint of the next topic to be discussed.

DIET AND SUSCEPTIBILITY TO DISEASE

In discussing the phenomena of infection and resistance, it was pointed out that there are other factors in communicable disease than the microbic agents of infection and the means whereby they enter the host. Much depends upon the

[1] "Report of the Committee on Nutritional Problems," 53rd Annual Meeting, American Public Health Association, Detroit, October, 1924, appearing in the *American Journal of Public Health,* December, 1924, Vol. XIV, No. 12, pp. 1038-1040.

resistance which the host offers. Among the factors which condition the general resistance of the body to microbic invasion, authorities assign, and increasingly so, primary importance to food.

There is a good deal of evidence of a historical nature in support of this relationship. In the Middle Ages, the ravages of pestilential diseases were greater in times of general starvation; in Ireland, when the potatoes have failed, and in India, when the grain supply has given out, disease has always been more rampant. While the correlation between pestilence and underfeeding is clear, there has been considerable skepticism in certain quarters concerning their causal connection. On the basis of the newer knowledge of nutrition, it is likely that such skepticism has been the result of a lack of understanding of the physiological effects of dietary deficiencies.

Insufficient or improper food does not lower resistance to all infections. Tuberculosis, pneumonia, colds, and typhoids are among the most prevalent diseases to which the undernourished fall victims. It is significant to note that in all of these, with the exception of pneumonia, diet is a primary curative agent. War edema, rather prevalent during the World War, is a condition associated with prolonged under-nutrition and accompanied to a noticeable extent by decreased resistance to various diseases, particularly tuberculosis. Similarly, rickets leads to lowered resistance, making persons peculiarly liable to bronchitis and broncho-pneumonia. Recently (1921) McCarrison has published a monograph filled with the protocols of numerous experiments, especially upon pigeons and monkeys, in which one or more of the vitamins have been omitted. The most valuable part of this work lies in the pathologic studies, in which it is shown that when one or more vitamins are absent from the diet, pathologic changes begin to take place, especially in the alimentary canal and in the endocrin glands, long before the disturbances are sufficient to be clinically recognized. It is also clearly brought out in McCarrison's studies that deficiency in vitamins increases susceptibility to infection and, what is of equal importance, a

properly selected diet plays a large part in the treatment of the infectious diseases.[1]

Another significant series of facts in this connection is the striking difference in infant mortality rates between breast-fed and artificially-fed babies. The studies made by the federal Children's Bureau, covering some 23,000 births in a number of different cities, show a most striking difference.

TABLE I[2]

Father's Earnings	Computed Death Rate per 1,000 Babies	
	Breast-fed	Artificially-fed
Under $550	41.8	288.6
$550–$849	39.6	178.3
$850–$1,249	20.2	108.8
$1,250–$1,849	29.2	104.2
$1,850 and over	15.6	26.0

The summary just cited is but one of a number of similar conclusions, and when the difference in constituent elements between human and other milk is recalled, it is impossible to avoid the conviction, whatever else one may read into the figures, that the diet of very young children is an important factor in determining resistance to the diseases which assail babyhood.

OTHER ASPECTS OF DEFECTIVE NUTRITION

"Systematic animal experimentation has revealed data of another kind which is of very great importance to us as an index to the importance of the right selection of food in the promotion of well-being. Such experiments have been undertaken at the author's laboratory to determine how sensitive animals are to diets in which the faults are of a minor character. Hitherto, emphasis has been laid almost entirely upon the 'deficiency diseases,' scurvy, beriberi, and possibly others, such as pellagra and rickets. The question which we asked ourselves was this: Are there deleterious effects of faulty nutrition caused by diets in which the deficiency is not of a nature or of sufficient gravity to induce a 'deficiency disease,'

[1] McCarrison, R., *Studies in Deficiency Diseases,* Hodder and Stoughton, London, 1921.

[2] Rochester, Anna, "Infant Mortality as an Economic Problem," *National Conference on Social Work,* Chicago, 1919, p. 200.

but which can be demonstrated in the life history of experimental animals? Is the body immune to faulty diet up to a point of deprivation of one or another dietary essential where the metabolic functions break down and clinically observable effects become apparent?

"We have sought to test this proposition by restricting young rats throughout life, and their progeny, if any, throughout several generations, to diets in which the faults were of a slight nature. A large number of groups of experimental animals were placed upon diets which were of good quality with respect to all factors other than the protein moiety. These were derived from a number of sources and always from a combination of two wholesome natural foods, such as two cereal grains, two legume seeds, a legume seed and an animal tissue —*e.g.*, muscle, kidney, liver, etc. In every case the protein content of the diet was adjusted at 9 per cent of the food mixture. This was done because experience had shown that when the quality of the protein is excellent, this is the smallest amount that will suffice to meet the nutritive needs of the animal during growth, promoting growth at the maximum rate, and support approximately the maximal fertility, making possible the rearing of most of their young. If the proteins of the food are of a quality which might be classed as good rather than excellent, the growth may be normal and the fertility fairly high, but many of the young will be lost during the nursing period. Poor proteins will not support growth at the optimal rate when they constitute but 9 per cent of the food mixture, and the fertility will be low.

"In this study we observed, therefore, the effect of a single defect in the diet, and that not of a very pronounced character, on the growth, fertility, infant mortality, and tendency to physical deterioration of families restricted to a monotonous dietary regimen. Observations were also made on the length of life, the age at which the first signs of senility appeared, and the effect of the diet on the nervous system of the animal. These afford very interesting data for correlation with human experience.

"It was found that a diet may be good enough to enable

young animals to grow at the normal rate and to full adult size, and support fairly high fertility, yet, solely because of the quality and amount of the protein which it contains, the animals may fail to nurse their young successfully to a state of independence. The young may require a nursing period of forty to sixty days instead of the normal twenty-five days before they can be safely weaned, owing to their stunted growth. This long period of nursing is entirely due to failure of the mothers to secrete milk of satisfactory character for the nutrition of their young, because their diet was not properly constituted.

"If the quality of the protein in the diet is somewhat below that which would produce the results described in the preceding paragraph, fertility may be lowered, and the mortality of the young born raised even to 100 per cent. The mortality is from two causes. One group of mother rats destroys its young within a day or two after birth. Female rats are, when well-nourished, very solicitous for the welfare of their young, and among such there is practically no infant mortality. The other group will attempt to suckle its litters but allow them to die because of malnutrition.

"It is a matter of grave importance to have demonstrated that making the diet faulty with respect to protein, but only to an extent which does not interfere with growth or with the maintenance of an apparent state of health in the adult, may profoundly affect the psychology of the animals in respect to so fundamental an attribute of the nervous system as the maternal instinct. Infanticidal tendencies in mothers in this series of experimental animals have been so common and so consistent that there can be no doubt that they had a dietary origin. We are now able to predict with assurance, as the result of experience, that on certain diets mother rats will destroy their new-born young.

"Perhaps as interesting as any of the results of this series of studies is the effect of faulty diet on the length of time during which the adult animals will maintain the full vigor of middle life, after their growth has been completed, on the experimental diet on which they are maintained throughout

life. This may vary greatly. A well-nourished rat may live as long as thirty-six months or, in a few cases, a little longer. By making the diet faulty in some degree with respect to the amount or quality of its proteins, we are able to make the span of life almost anything we desire. Rats can be made to grow at the optimal rate and to full adult size, and appear to be in a satisfactory state of nutrition, yet begin to deteriorate as soon as their growth is completed. Again, they may be made to preserve what appears from their external appearance the full vigor of middle life for a quarter, a third, a half or any other fraction of the extreme span of life which they are capable of living. When the diet is faulty they tend to grow old rapidly." [1]

It is a thought-provoking fact that faulty diets should have profound nervous effects, and opens up some interesting vistas. The effects on animals seem most pronounced with diets deficient in calcium and phosphorus. Inadequacy of the protein of the diet is also capable of causing irritability and nervousness. "We have observed a group of rats which had been restricted, during growth, to a diet in which the sole protein content was 6 per cent, half of which was derived from maize and half from peas. They were very apprehensive of danger and would retire in alarm when the cage was opened. Well-nourished animals do not become alarmed under such conditions.

"In extreme cases, young rats which are restricted for a few weeks to such deficient diets become extremely nervous and irritable. When the cage is opened they may retreat as far as possible and sit upon their haunches or crouch in an attitude betraying great alarm, and squeal when an attempt is made to pick them up with tongs. One would certainly be bitten if one were so rash as to attempt to take them in the bare hands. It is often difficult to seize them by a foot or by the tail by means of tongs because of their frantic springing about. They even leap out of the cage past their

[1] McCollum, E. V., "Nutrition and Physical Development," *Annals of the American Academy of Political and Social Science*, Philadelphia, November, 1921, pp. 39-40.

would-be captors. Normally nourished rats can be placed in a box together and transported to the balance for weighing, without arousing any excitement. When the box is temporarily uncovered they do not evince a desire to escape. The nervous ones, made timid by faulty nutrition, under these circumstances jump about frantically and make violent efforts to escape the instant that a ray of light is admitted to the box." [1]

Nutrition and Efficiency.—Efficiency is so inextricably bound up with health, and health in turn with nutrition, that there is nothing surprising in the fact that the more farsighted employers are beginning to realize that cafeterias and lunch rooms are an integral part of a modern business organization. The British Health of Munition Workers' Committee found that 25 per cent of the munition workers were undernourished. After providing workers with food at cost price, one large English company found a gradual reduction of the sickness rate until it was ultimately cut in two. It requires but little imagination to see the tremendous possibilities in the practical working out of this idea, with lunch rooms as a part of modern industry, in which the food essentials offered day by day will be adjusted scientifically to the particular needs of the workers.

Diet and Preventive Medicine.—In the development of preventive medicine, which is inspired by the prospect of preventing disease and keeping well people well, it is being recognized that it is the gradual operation of more or less constant but unperceived causes, rather than of great and marked exposures, which in nearly all cases are responsible for undermining the health of the individual. More and more importance is being attached to an improperly constituted diet as one of these causes, for it seems definitely related to inferiority in physical development, instability of the nervous system, lack of resistance to certain infections, lack of recuperative power and endurance, and length of life.

Inspiring as the recent progress in our understanding of

[1] McCollum, *The Newer Knowledge of Nutrition,* pp. 381.

these matters has been, the development of the science of nutrition lies in the future, not in the past. Now that students of nutrition are following the earlier examples of medical men and surgeons and pursuing their investigations through animal experimentation, gains in this field comparable to those in medicine and surgery are sure to be made, gains destined to be of equal blessings to the human race.

SOCIAL FACTORS IN NUTRITIONAL PROBLEMS

The problems of nutrition cannot be separated from the social conditions which create and complicate them. From what has been said concerning the food requirements for physical well-being, it is possible to appreciate the significance in this connection of the social transformation which ushered in our modern industrial civilization. Three aspects of that transformation in the United States will be given brief consideration.

1. *The Complete Change in the Mode of Living.*—For countless generations man was an outdoor animal, living a rather active life. Through the centuries, on the basis of his needs, and within the range of possibility, he developed certain dietary customs. There are folkways and mores in eating just as there are in other things.

Suddenly, and on a most extensive scale, man turns to an indoor life, largely sedentary in character. Such a complete change in his mode of living revolutionizes a great many of his needs, not the least important of which concern food. But here, as in so many aspects of his life, there is what Ogburn [1] calls a "cultural lag." Man carries the age-old food habits of his outdoor life into his new, artificial, indoor life. Diets, like laws and political arrangements, continue to flourish long beyond the conditions which led to their development. Small wonder it is then, after all, that the death rate from the diseases involving the digestive system should be increasing at a time when the general death rate is falling.

2. *The Complete Change in Our Economic Products.*—

[1] Ogburn, W. F., *Social Change*, B. W. Heubsch, New York, 1923.

"We are now in a position to understand the reasons for the rapid increase in tooth decay and in faulty skeletal development which has taken place during the past century, and which has been hitherto inexplicable. There has been a rapid and steady increase in the consumption of cereal products during the last century. The consumption of cereal grains in liberal amounts is an innovation in human experience, for cereals could never be cultivated on a large scale until the invention of modern plowing, reaping, and threshing machinery. Grass has always been the most serious enemy of agriculture, and only effective implements could cope with it. This is the reason why rice, which developed for a considerable period on flooded land, was the earliest cereal to be widely cultivated.

"Not only have we come to consume ever more and more cereal products, but the modern milling industry has furnished us with more and more milled cereal products, such as bolted flour, degerminated cornmeal, and polished rice, which are very inferior to the unmilled cereal grains in their dietary properties in respect to several dietary factors. We have simultaneously reduced our consumption of dairy products and green vegetables from the amounts which were taken by people of a century or more ago in many regions of Europe and America where physical development was most satisfactory. These changes are sufficient to account for the deterioration which we are now witnessing. Carnivorous man, such as the Eskimo, the Indians of America, the Lapps and the pastoral tribes of Asia and Africa, are highly successful in their nutrition. The Oriental, who eats very liberally of leafy vegetables, bamboo sprouts, and weeds which serve as pot herbs, is successful—for reasons which we can now easily explain. The people of Switzerland, Scandinavia, Ireland, parts of Scotland, Iceland, and the Hebrides are highly successful with their nutrition because of the large quantities of dairy products which they consume. In England, parts of Scotland, and many places on the Continent, as well as tens of thousands of homes in America, where the meat, bread, and potato type of diet is the rule and where little milk and

few green vegetables are eaten, physical degeneration has resulted and is further in progress." [1]

3. *The Presence of the Immigrant.*—The problems of nutrition, created by a sudden transformation in the mode of living and the food products available, are nowhere more evident than among the foreign element in the United States. This element constitutes a very considerable proportion of our population: more than one-eighth (13.2 per cent), if only the foreign born be included; more than a third (34.8 per cent), if those born here of foreign or mixed parents be included.

The problems presented are varied in character and in significance. To begin with, a foreign housekeeper, immediately upon arrival, is confronted with many new and strange kitchen appliances. There are double boilers and agate utensils, "funny egg-beaters that you turn as you do a hand organ," and "stoves with no fire in them and no place for the wood, just holes in iron, and if you turn a handle and apply a lighted match, fire comes."

Although many come from countries in which the climate is different from ours, and the occupations they enter require different kinds and amounts of food, they will continue to eat certain foods prepared in certain ways. Why change? There are changes, of course, due to their inability to pay the price of old staples. This means the elimination of certain essential elements from the diet, generally without a corresponding addition of American products. The result is an upsetting of the balance of the traditional diet, and a marked restriction in the variety of foods afforded. The significance of this will be apparent when it is remembered that the best insurance against food deficiency is a varied diet.

"The derangement of the hereditary diet often presses hard on the children. Although the immigrant mother is accustomed to breast-feeding her babies, often nourishing them thus long after the usual period, early in life the child is given other food, too often from the family table. The beneficial effects of breast-feeding, therefore, in reducing infant mor-

[1] McCollum, *Annals*, pp. 41-42.

tality, are often counteracted after the first few months of life by unwise additions to the child's diet." [1]

The problem of milk consumption among the foreign population is particularly serious. In her native land, the foreign mother went out-of-doors, chased the goat, milked it, and gave her child to drink. "The milk was comparatively clean and too fresh to be contaminated by the growth of bacteria. Then this woman comes to America; she has to buy milk, and it seems to cost a great deal. It has been a drink to her, and its food value is not appreciated. It seems astonishing to pay out a large sum of money for merely something to drink, something, furthermore, which the adults of the family—particularly the man—are likely to care very little about. . . .

"From immigrants with these backgrounds it is unreasonable to expect a sufficient and wise use of milk, which must be purchased and cared for under city, or even town conditions, in the United States, unless there is built up a wholly new attitude of mind and of family habits in regard to it." [2]

The dietary problems of the Jewish immigrant groups are relatively pronounced because in addition to those created by the transition in their manner of living upon arrival in America, there are many prohibitions of a religious nature which must be observed. These problems are not only in regard to the kinds of food, but their preparation and times when different foods may be used. Jewish diets are apt to include too many highly seasoned foods, too many "sours," too little milk, too few vegetables, and too many carbohydrates.

The Fundamental Need.—The American people need a reordering of their dietary habits in accordance with the requirements of modern living and on the basis of our newer knowledge of nutrition. This newer knowledge, thus far confined largely to the scientific journals, needs to be popularized. Its fundamental conclusions, expressed in the very simplest forms, must be transmitted to the great mass of the

[1] Davis, M. M., Jr., *Immigrant Health and the Community*, Harper & Brothers, New York, 1921, p. 249.
[2] *Ibid.*, p. 252.

people. This task, which is one of popular education, must be performed quickly and effectively, lest it be essayed by the charlatan and the quack. Even now the sale of "vitamins" has begun and flourishes because purchasers are ignorant of the fact that a simple, varied diet can furnish them with all the vitamins they need.

The readjustment of dietaries among the foreign born is a somewhat more difficult task. The approach must be sympathetic and based on an appreciative understanding of traditional habits. The fundamental problem is not so much that of introducing a complete American dietary as a restoration of the former balance by supplying lost elements. Whatever modifications of dietary essentials for the foreign folk in America there are to be, should be worked out as far as possible on the basis of foods familiar to them. Americanization programs might well place dietary instruction on a par with other less prosaic, and perhaps less important, emphases.

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CHAPTER XVI

SOCIAL AND ECONOMIC FACTORS IN DISEASE

It is a naïve practice—this habit of considering man's health apart from the circumstances of his life; it is a curious commentary on our intelligence—this slow recognition of the importance of social and economic factors in physical well-being.

DIFFERENTIAL DEATH RATES

Rural and Urban Rates.—As early as the seventeenth century, Captain John Graunt, one of the earliest English writers to perceive the importance of vital statistics, pointed out the differences in mortality rates between city and country. It was the decimating urban death rate of the Middle Ages and of early modern centuries that kept the cities from making substantial headway in the growth of population. In London, the ordinary death rate of the seventeenth century is estimated to have been about 50; and it was not until after 1800 that the annual death rate went below the annual birth rate, thereby permitting the city to grow through natural increase. London was not unique in this respect among European or American cities; on the contrary, her showing was better, probably, than that of other large centers of population. In all past years, the city death rate, at every stage of life, was higher than that of the rural district. In the United States, in the first decade of the twentieth century, the rural death rate in the registration area was 13.8, while in the urban districts it was 17. In 1922 the death rate for the rural parts of the registration area was 10.9, while for the cities it was 12.6. The actual difference is greater, of course, than the crude statistics indicate. American cities have been built up to a large extent by migration, both from abroad and from the surrounding rural areas in this country. The consequent disturbance of the age

structure of the urban and rural populations is highly important. A third of our city dwellers are in the age group, twenty-five to forty-four years, but only a quarter of our country dwellers. It is important to remember, too, in contrasting recent urban and rural death rates, that the city has superior medical facilities, and that preventive health work has been confined largely to it and is only now slowly invading the rural regions. All this makes the difference in favor of the rural district much more pronounced than a mere comparison of the rates would indicate.

Urban and rural life are so largely and so fundamentally unlike each other that the constant difference in their mortality and morbidity rates cannot but be attributed by and largely to the contrast in the circumstances of the daily span which they offer. The higher urban death rate is due, then, primarily, to the living and working conditions which are peculiar to the city.

A Comparison of Urban Mortality Rates.—More marked than the difference in living and working conditions between city and country are those found in a comparison of cities with one another. Equally striking, since they result from such differences in social and economic life, are the variations in mortality rates among the cities of the United States. The following table will serve as an illustration:

TABLE I

MORTALITY RATES OF SELECTED AMERICAN CITIES: 1923.

Boston	14.9
Chicago	11.7
Cleveland	10.8
Louisville	16.2
Lowell	14.6
Memphis	19.9
Oakland	10.8
Pittsburgh	15.8
Providence	14.8
Salt Lake City	12.4
Spokane	11.7

It is understood, of course, that these differences in crude mortality rates cannot be attributed wholly to contrasts in social and economic conditions. Such factors as racial composition of the population, the age and sex distribution, the

relative number of deaths of non-residents, etc., may be of appreciable importance.

Infant Mortality Rates in American Cities.—The best basis of comparison for the purpose of this discussion undoubtedly is the infant mortality rate. This rate is accepted generally as the most sensitive index of social and economic conditions, and, being reckoned on the basis of a thousand births rather than a thousand persons, is not modified by the age and sex structure of the population. The following rates, selected from the 1925 report on infant mortality, published by the American Child Health Association, will serve to show the wide divergence in this respect among American cities:

TABLE II

INFANT MORTALITY RATES, SELECTED CITIES, 1925.

Lowest		*Highest*	
Population Over 250,000			
Seattle, Wash.	45	Washington, D. C.	87
Portland, Ore.	46	Buffalo, N. Y.	86
San Francisco, Cal.	55	Boston, Mass.	85
Population 100,000–250,000			
Salt Lake City, Utah	45	Norfolk, Va.	97
Oakland, Cal.	52	Fall River, Mass.	90
Cambridge, Mass.	53	Richmond, Va.	90
Population 50,000–100,000			
Union City, N. J.	38	Huntington, W. Va.	110
Brockton, Mass.	39	Chester, Pa.	105
Tacoma, Wash.	44	New Britain, Conn.	103
Population 25,000–50,000			
Oak Park, Ill.	35	Pensacola, Fla.	124
Malden, Mass.	40	Petersburg, Va.	123
Everett, Mass.	41	Lewiston, Me.	121
Population 10,000–25,000			
Stonington (town), Conn.	32	Martinsburg, W. Va.	156
Winona, Minn.	32	Shenandoah, Pa.	145
Forrest Park, Ill.	33	Wilson, N. C.	145

Reference has been made (Chapter II) to the correlation between infant mortality and the earnings of the father, as shown in the studies made by the Federal Children's Bureau. These studies show differences within the population of a city on the basis of economic and social contrasts (assuming that

the father's earnings are a fair index) even more marked and striking than those found between cities. The following table is based upon a study of over 23,000 births, in eight scattered cities, as made by the Children's Bureau:

TABLE III

City	Deaths of Infants Under One Year of Age per 100,000 Live Births, by Specified Annual Earnings of Father		
	All Earnings	$1,250 and Over	Under $550
All Cities	111.2	64.3	151.4
Johnstown	130.7	87.6	260.9
Manchester	165.0	58.3	204.2
Brockton	96.7	73.5	67.1
Saginaw	84.6	22.2	142.0
New Bedford	130.3	59.9	168.7
Waterbury	122.7	68.4	151.1
Akron	85.7	40.0	117.5
Baltimore	103.5	64.7	138.0

It will be noticed that Brockton differs from the findings for other cities. Two explanations for this peculiar showing may be advanced: First, the groups are comparatively small, and consequently may have been considerably influenced by exceptionally favorable conditions in the year selected; second, the earnings as reported in the lowest earnings group do not always reflect the family's standard of living.

On the whole, however, the conclusion to be drawn from these studies is quite obvious.

OTHER VARIATIONS IN DEATH RATES

There are many diseases whose incidence varies on the basis of social and economic conditions as extensively as does infant mortality. In studying tuberculosis mortality rates, one finds unusually high rates in certain areas of a city. Drolet, of the New York Tuberculosis Association, made a very exhausting analysis of the tuberculosis death rates in various parts of the Borough of Manhattan, comprising a population of

2,000,000 and covering 219 sanitary areas, most of which varied in population from 8,000 to 15,000. "The differences in the death rates in these sanitary areas were most astonishing. The study showed that in 25 sanitary districts there was a death rate of over 400 per 100,000, and that in 44 sanitary districts the death rate was under 75. No intensive investigation is necessary to convince oneself that in the areas which showed a death rate of over 400 (running in some places up to over 1,000) there were marked economic and racial conditions which provided a very low standard of living, and that in the areas where the death rate was under 75 the economic and racial conditions were most favorable.

"From the chart accompanying the survey one notes that the favorable areas are in the highest-class residential districts near Central Park and along Riverside Drive, and that the highest death rates occur in the most populous and poorest districts. There is a notable exception, however; for in the lower East Side, a very congested area of the city where the standards of living are low, there are two sanitary areas with an extremely low death rate. This entire section is largely populated by Hebrews, in whom there is an apparent racial immunity from tuberculosis.

"Guilfoy, of the New York Health Department, in a similar series of charts has shown that tuberculosis is not the exception in varying death rates, that similar variations occur in almost these identical areas for pneumonia, measles, scarlet fever, and Bright's disease." [1]

In all countries the variation of death rates on the basis of economic conditions has been seen. Rowntree, in his classic study of poverty in York, England, found that the death rate in the poorest section was 27.8, in the middle-class section was 20.7, and in the "highest" section was only 13.5. Levasseur found that the death rate in the poorer section of Paris was 31.3 per 1,000 population, as contrasted with 16.2 for middle-class sections and 13.4 for the richest sections. Similarly, Robertson found in Birmingham, England, that in 1908 the

[1] Williams, *op. cit.*, pp. 67-68.

death rate for the section inhabited by unskilled artisans with low wages was 22.5, as against 15 for the entire city.[1]

DIFFICULTY OF ISOLATING THE FACTORS

The correlation between mortality and morbidity statistics on the one hand, and general social and economic conditions on the other, can be readily established. When, however, evidence is sought on the specific effect of any particular factor, difficulties of all kinds are encountered. For example, low income appears to be correlated with a high death rate, but so does bad housing, ignorance, inadequate diet and lack of medical attention, all of which are found most frequently in low income groups. Just what importance is to be attached to each of these factors separately it is difficult to determine.

Again, a particular working condition, like dust, may be recognized as a definite health hazard, but the dust hazard may be accompanied by a high wage and a short working day, and these latter may nullify completely the bad effects of the former. Human life, it cannot be emphasized too often, is exceedingly complex. Perhaps it is impossible to isolate any one given factor and measure its effects. Certainly this has not been done as yet with any degree of satisfaction, and any progress in this direction will require much more careful work than has been done in this field thus far.

While no attempt will be made, therefore, by way of appraising the relative importance of any one social or economic factor, several of the more important ones will be given consideration as to their general nature and effects.

HOUSING

Practically every American city, because of its rapid growth and the preoccupation of its inhabitants with other matters, has its housing problems. It was not until the first decade of the twentieth century, however, that any real consciousness of these problems developed. This awakened consciousness was beginning to lead to constructive results when the World War broke out and immediately complicated the situation.

[1] Public Health Bulletin, No. 76, *op. cit.*, p. 37.

During and after the war period the increased cost of labor and material, inadequate transportation facilities and high freight rates, the diversion of money to the production of commodities considered more essential and to tax-exempt bonds, all led to a housing shortage which became acute the world over. In 1920, a housing survey in American cities of 200,000 or more population, made by direction of the Senate Committee on Reconstruction and Production, revealed that there was a diminution of 80 per cent in the normal volume of new buildings for residential purposes, and that this shortage had continued for three years.[1] About the same time, Wood, on the basis of numerous housing surveys made in various parts of the country, concluded that "roughly stated, one-third of the people of the United States are living under subnormal housing conditions, conditions which fall below the minimum standards we shall presently describe, and about a tenth are living under conditions which are an acute menace to health, morals, and family life, conditions which tend to produce degenerative changes in those subject to them." [2]

The effects of bad housing have been emphasized most in connection with tuberculosis. Many volumes and innumerable reports have been written concerning the relationship between the two, with the almost unanimous agreement that unsanitary housing is an important factor in the breeding and dissemination of this disease. "Flick, of Philadelphia, and others have pointed out that certain houses become infected and that new families coming into such houses, even those without previous history of the disease, are likely to become infected. . . . Quite naturally, bacilli deposited in dark, damp places retain their vitality for a longer time than those which find their resting-places in dry, well-ventilated, sunny places. The laws of many states and cities provide that when a house is vacated by a tuberculous family the rooms and fixtures be thoroughly sterilized before a new

[1] *Proceedings of the National Housing Association,* Chicago, 1920, pp. 190-191.

[2] Wood, Edith E., *The Housing of the Unskilled Wage-Earner,* The Macmillan Company, New York, 1919, p. 7.

family can move in." [1] Williamson, of Edinburgh, finds that the number of cases of pulmonary tuberculosis in any district is practically in direct proportion to the number of one- and two-roomed houses which exist in it. On the question of housing and tuberculosis he says: "The key to the whole situation lies unquestionably in the housing situation." [2]

In the last few years, the data on the general effect of housing upon health has been subjected to a careful scrutiny on the basis of our newer knowledge of bacterial diseases. It is obvious, in view of our present understanding, that housing conditions do not generate disease. It is only when and where the germs of infection are present that housing conditions may be a factor in their transmission. "The unventilated front parlor could not produce tuberculosis in a hundred years; diphtheria does not develop from the family well, despite many a well-meant tirade on its evils; and typhoid fever, in sand or clay areas, is but seldom properly traceable to that source, either. Stagnant or old, long-standing water is to this day often considered responsible for typhoid, despite the definite knowledge that no system of purification of typhoid-infected water is more reliable than impounding, which is merely keeping it standing." [3]

Bad housing is most often associated with the diseases of the respiratory tract—tuberculosis, pneumonia, colds, influenza, bronchitis, etc. Each of these is transmitted from individual to individual, with a considerable emphasis upon droplet infection. Thus it becomes clear why overcrowding has come to be considered as the most important aspect of the housing situation in regard to health. In other words, it is not the house itself, but the use or abuse to which it is put, that makes it a health menace under conditions of existing infection. In considering the relation of housing to health, it is important, therefore, to make a clear distinction between the house as a structure and the use to which it is put by its occupants.

Congestion may be of two kinds: acre or block congestion,

[1] VAUGHAN, *op. cit.*, Vol. I, p. 469.
[2] *Ibid.*, p. 470.
[3] HILL, *op. cit.*, p. 13.

and room congestion. The former has reference to the number of inhabitants within a given area (acre or block). It is essentially a phenomenon of cities. Room congestion refers to the number of persons per room, and may exist in the city or country, but actually is found mostly in industrial centers. The immigrant has been the worst offender in this respect. In nearly all industrial communities to which workers of the new immigration have come, the boarding and lodging house is a familiar institution. There the foreign laborers who are unmarried or who have left their families in the homeland crowd together. "By reason of the tendency of workmen of the same race to lodge in the same section or town, the lodging-houses exhibited many instances of extreme overcrowding. Thus, in one case there were twenty-three lodgers in a four-room house, and it was by no means uncommon to find a single room occupied by from three to twelve workers. The lodgers, for the most part, slept two in a bed. In some of the lodging-houses, where the men work on both 'day and night turns,' the occupation of the beds is almost continuous, the night men taking during the day the places of those sleeping at night in the beds. The beds themselves were usually old and in filthy condition, destitute of bed linen, the covers consisting of old bed quilts. . . . Very few of the rooms were susceptible of thorough ventilation. Indeed, but little advantage would have been taken of such a provision, as all windows were found carefully closed and the temperature was still further raised by small stoves." [1]

OCCUPATIONAL DISEASE HAZARDS

Once the fact was grasped that the amount of sickness and the number of deaths were affected by living conditions, it was natural that sooner or later the role of the occupational background should be recognized; with the rise and expansion of modern industry, it was inevitable that its importance should be emphasized increasingly. In England, because of the number and variety of her manufacturing interests, the

[1] Schereschewsky, J. W., "A Report on the Prevalence of Trachoma Among Steel Mill Workers in East Youngstown, Ohio," *United States Public Health Service Reports,* March 6, 1914, pp. 565-566.

subject first received consideration; in this country, little attention was given it until within the last decade. During this time, a considerable body of data has been gathered, showing some rather definite correlations. Mortality statistics show higher rates among wage-earners than among the proprietary and professional classes; there clearly are excesses of different fatal diseases in different occupations; there are striking differences in death rates by occupations. Morbidity rates show similar variations. Two facts in particular prove that we have accepted the premise of the relationship between industry and health, or the lack of it—the increasing amount of legislation to decrease certain health hazards in industry; and the utilization of occupation, along with age and sex, as a variable in the determination of life insurance rates.

An industrial health hazard may be defined "as any condition or manner of working that is unnatural to the physiology of the human being so engaged. This physiology is adaptable to quite wide variations in environment, but the rule holds absolute that the subjection to conditions which are unnatural to the physiology and habit of man results in pathology and disease."[1] The chief industrial health hazards are dust, dirt, dampness, devitalized air, temperature, fatigue, inactivity, infections, and poisons. About two-fifths of the entire population of the United States are affected directly by the nature of working conditions. In regard to the specific effect of these conditions, much remains to be learned, much to be unlearned. Traditional views need to be revised, and blatant statements must be checked up. Here is another fruitful opportunity for careful research and study. In venturing, therefore, to discuss briefly several of these hazards, it can be hoped only to suggest certain of the more outstanding facts in connection with them.

The Dust Hazard.—Dust is the great enemy of the worker. Of all the hazards of industry, it is by far the most common. It has been estimated that more than 5,000,000 American wage-earners of both sexes work under conditions more or less

[1] Hayhurst, E. R., "Industrial Health Hazards and Occupational Diseases in Ohio." *Ohio State Department of Health,* Columbus, 1915, p. 10.

injurious to health because of atmospheric impurities caused by dust, fumes, and gases. The more important occupations in which excessive amounts of dust are found are: all forms of grinding and many processes of polishing and cleaning; the lead, copper, and iron trades; pottery works and masonry; the handling of leather, skins, wool, cotton, wood, paper, cement, and tobacco; the cutting of various stones; and many other miscellaneous trades.

The kinds of dust vary in their hygienic significance. Some are poisonous, some act as mechanical irritants. Persons exposed to excessive amounts of dust for long periods of time suffer from a general condition known as pneumokoniosis; when due to coal dust the condition is known as anthracosis; when due to stone dust, siderosis; when due to vegetable fibers such as cotton, byssinosis.

Dusts in general produce a chronic catarrh of the respiratory and digestive organs. This leads to a fibrosis, which is the same process that is brought about gradually by old age. These catarrhs and fibroses result in lowered resistance of the damaged parts, and invite secondary diseases, which are usually the cause of death. The respiratory diseases are the ones most generally connected with the dust hazard. Of these, tuberculosis is most frequently mentioned. "Statistics taken over a period of years show quite conclusively that workmen suffer to a greater extent from this disease than do others in the general population. But when we consider individual occupations, there are interesting anomalies. One would expect, of course, that workers in quarries who inhale hard dusts which attack the lungs and the tissues of the respiratory tract would show a high incidence of tuberculosis. This expectation is borne out by the facts. On the other hand, it is difficult to explain why coal miners, who work under conditions which are favorable presumably to the spread of tuberculosis, should show but a small percentage of deaths from so-called 'miner's phthisis.' It is equally difficult to explain, on this basis, why there should be a high percentage of deaths from tuberculosis among clerical workers." [1]

[1] FRANKEL, *op. cit.*, p. 37-38.

Heat and Humidity.—In iron and steel industries, smelters, chemical, pottery, and glass factories, engine and boiler rooms, stokeholes, etc., workers are exposed to abnormal temperatures. The exposure to heat produces prostration, exhaustion, muscular cramps, and acute colic when the effects are extreme, while in the long run it produces anemia, catarrh, rheumatism, Bright's disease, skin eruptions, gradual fibrosis, and premature old age. The rising of the body temperature, thermic fever, which takes place more or less constantly among heat-exposed workers, is accompanied by the production and accumulation of definite poisons or toxins within the body, which are responsible for the effects noted above. Hence he who shows effects of exposure to heat has been poisoned occupationally, although the poison in this case has been elaborated within his own system.[1]

If heat is combined with moisture, the effects upon health are still worse, since the failure of opportunity for the evaporation of the normal perspiration on the surface of the body is interfered with, thus disturbing, seriously, the heat-regulating mechanism. Such disturbances oppress breathing, the kidneys are overworked, and the nervous functions are depressed.

Abrupt changes from one extreme of temperature to another also should be avoided. They may lead to congestion of the internal organs, due to the inability of the body to adapt itself to such sudden variations. Respiratory diseases of all kinds appear to be unduly frequent in persons exposed to high degrees of heat, and a recent study of the common cold by E. O. Jordan indicates that a large percentage is caused by changes in the heat-regulating system of the body.

The textile industries have gained an unenviable reputation as an unhealthy occupation because they combine, usually, the two hazards just alluded to. Much dust is raised during the various processes in the textiles, that given off by jute being particularly irritating. The atmosphere is kept usually very warm and moist to keep the fiber pliable and workable. Neither evil is necessary, and general improvement in the

[1] HAYHURST, *op. cit.*, pp. 29-30.

sanitary conditions of textile mills is one of the promising signs of material advancement in industrial hygiene.

Excessive Cold.—"Damp, cold, or chilly air is also troublesome, as it causes the body to lose an undue amount of heat and favors the development of respiratory diseases, neuralgic and rheumatic conditions. Icemen, makers of artificial ice, and workers in cold-storage plants, suffer from rheumatism, neuritis, and chronic kidney trouble, as a result of exposure to excessive cold. Damp, cold indoor air constricts the blood vessels, causing a diminished blood-supply on the surface of the body. The resisting power of the individual is lowered and diseases, such as pneumonia, tuberculosis, and catarrh, are easily acquired." [1]

Compressed Air.—"In building tunnels, laying deep foundations for buildings, and erecting bridges, it is necessary to carry on work under air pressure in order to prevent the entrance of water into the excavations. For example, the construction of the underwater tunnels, or 'tubes,' between Manhattan Island and Brooklyn would otherwise be impossible. Such large-scale operations necessitate the employment of many men who may be subject to caisson disease, a serious health hazard and an important medical problem of industry. . . .

"Generally the symptoms begin with great suddenness. The patient complains of vertigo, pains in the joints and abdomen, and often doubles up with pains in the back and legs, which symptoms give the disease its name—the 'bends,' 'screws,' or 'staggers.' There may be paralysis from the waist down. Cerebral or subcutaneous hemorrhage, coma, difficult breathing, collapse, or sudden death may occur. Cases of localized pain, vertigo, and difficult breathing can be relieved by recompression, as can symptoms due to affections of the central nervous system." [2]

Fatigue.—During the last twenty years there has developed a considerable interest in the subject of fatigue, particularly as it relates to efficiency in industry. Economic engineers

[1] FRANKEL, *op. cit.*, pp. 43-44.
[2] *Ibid.*, pp. 45-46.

find that efficiency ceases when fatigue begins, that it pays to give employees a rest at stated intervals, and that a decrease in the number of hours reduces fatigue and increases production. Simultaneously with this interest in fatigue from the economic side, there has developed gradually an appreciation of its relation to physical and mental health. While this relationship has come to be recognized in labor legislation and court decisions, there is as yet nothing like agreement in regard to the more specific features in its indictment. Here is still another field calling for research and the exchange of scientific data. There is now an international committee at work on the subject of industrial fatigue, and some definite contributions may result from its work.

The following summary of the subject by Hayhurst is selected for presentation here. Other points of view are easily accessible.[1] "Fatigue," says Hayhurst, "is one of the most common causes of occupational disability. This is a prime cause of the fact that bodily development in factory classes remains inferior to that in other social classes. Fatigue is defined as loss of irritability and contractility brought on by functional activity. The sensation of fatigue is due to the accumulation of waste products within the system called fatigue poisons (definite chemical substances) and fatigue toxins. The poisons are acidic in character. A fatigued muscle is acid in reaction, while one at rest is alkaline. Of the poisons, leucomaines are one type and are similar in action to ptomaines obtained from putrid meats. The presence of such substances is easily demonstrated, as, for instance, in the dog experiment in which a few cubic centimeters of blood removed from the veins of a dog which has been run until fatigued, and then injected into another dog, not previously exercised, within a few moments causes symptoms of fatigue to appear in the second animal; even paralyzing effects and, finally, death may follow after a period of extreme exhaustion. There are many other ways of demonstrating the presence of this fatigue substance. Fatigue poisons do not accumulate in

[1] Fisk, *Health Building and Life Extension,* Chap. XI. Lee, F. S., *The Body Machine.* Kober and Hanson, *Diseases of Occupation and Vocational Hygiene,* Division III.

the system if time intervals are sufficient for the circulation to counteract and remove them between muscular efforts. These symptoms, when they appear, are usually not more prominent in the particular muscles or parts used than throughout the system in general. The brain, which is the source of motive power, always suffers in fatigue, no matter what part of the body is overworked.

"Workers who begin a new process at first feel the symptoms of fatigue very quickly, but gradually the period of continuous application is extended until, as we have explained, the person has become used to the work. This is more than the matter of establishing a good circulation of blood to the parts used, and the training of nerve paths. It seems in part to be due to an antitoxin carried within the blood which destroys the fatigue toxin at its source in the muscle. 'Getting into training' is but the working up of this fatigue antitoxin.

"Fatigue symptoms should never be permitted to exist in industries. These are, in a minor way, tiredness, sore muscles, stiff joints, aches and pains, etc., while in a more severe form we have such signs as muscular cramps, obstinate lumbago, wry neck, neuritis, neuralgia, and 'occupational neuroses,' in which any attempt to return to the regular work results in spasms of the muscles used, accompanied by soreness, constant aches and pains, trembling, gradual emaciation, and partial paralysis of the parts. In time, ligaments weaken so that flat feet occur (perhaps with varicose veins, eczema and ulcers), round shoulders, bowed backs, and sunken necks. Internal organs drop downward (especially the kidneys and female organs), causing much chronic invalidism. Such signs are usually accompanied with a mental condition of anxiety which is out of all apparent proportions to what can be seen, and along with headache and constipation make up the disease condition known as 'neurasthenia.' Neurasthenia is practically always occupational. In females 'hysteria' is a frequent associate. The next stage is 'nervous breakdown.' Many persons, of slightly unsound condition to begin with, develop a 'fatigue psychosis'—that is, insanity which may

be sudden and violent, or just a gradual deterioration characterized as 'played out,' 'no good any more,' 'can't make his day's wages,' etc. Our hospitals, dispensaries, charities, various institutions and asylums are crowded full of these classes of persons. About 90 per cent of them are over forty years of age, which makes a significant contrast with the age-group figures for wage-earners in manufacturing industries, about 90 per cent of whom appear to be under forty years of age.

"Fatigue which affects the steady worker causes anemia, enlargement of the heart, increased blood pressure, circulatory diseases, kidney disease, and neurasthenia or nervous exhaustion. This latter is a very common complaint of the working classes. Chronic fatigue disposes to weakness and paralysis of special parts, and to nervous breakdowns. The general fibrosis of all organs and parts encroaches upon the reserve forces of these organs and parts. Premature old age is a consequence. During the course of any of these chronic affections, which are usually progressive when once incited, the person is predisposed to all manner of acute diseases, one of which, in the end, is finally signed upon the death certificate as the cause of demise." [1]

The chief conditions in modern industry which cause excessive fatigue are long hours of labor, the piecework system, the increasing use of machine methods, and faulty posture while at work. The facts involved in these conditions are so well known that no further exposition is necessary.

THE EMPLOYMENT OF WOMEN

The inventions of the past century have changed considerably the position of women in the home, both directly by taking a number of their historic occupations from the home to the factory, and indirectly by lightening the burdens and labor of housekeeping. Meanwhile, tasks are being simplified in industry with the increasing subdivision of labor, and the single man's standard of wages is growing. Spurred on, thus, by increasing opportunities or by economic necessity

[1] HAYHURST, *op. cit.*, pp 33-36.

or by both, women, like men, have sought, more and more, employment outside of the home.

In 1920, according to the United States Census, 8,549,511 women, more than one-fifth (21.1 per cent) of the female population ten years of age and over, were gainfully employed. Of these, almost one-half (48 per cent) were employed in modern factory, mercantile, and mechanical establishments, and in various professional pursuits. Approximately four-fifths of women workers live with their families and contribute to their support. They are, for the most part, the wives and daughters of the wage-earning heads of families. In about one-tenth of the wage-earners' families in the United States, the wife is a wage-worker, but in certain industries the proportion is much larger.

The entrance of women into gainful occupations outside of the home is a new phenomenon, and raises many profound problems. Not the least important of these problems is that of health. In view of the fact that in the population as a whole the female mortality rate is less than the male, it seems reasonable to assume that, excluding confinements, the female morbidity rate is at least not greater than the male. It is significant to note that among women employed as wage-earners, these conditions are reversed. A number of investigations, both in this country and in Europe, fortify this conclusion.

A number of reasons for the greater health hazard to wage-earning women at once suggest themselves. Undoubtedly, the precariousness of their employment in many cases acts as a constant spur to them to go beyond the limits of their strength, particularly when they are employed on piecework. Furthermore, the household duties of wage-earning women, especially of working mothers, begin considerably earlier than the opening of the gates of the mill or factory or of the doors of the store where she is employed, and are not ended when she comes home. She thus carries a double burden, to which, if is added that of child-bearing, one requires but a modicum of common sense to appreciate the effects upon health and viability.

The plain fact of the matter is that many occupations have not yet been adapted to the physiology of the female sex. The employment of women at positions requiring protracted standing, which physicians with experience regard with apprehension, is an illustration in point. The bones of the ankle and feet of women are too small usually to sustain their weight for long peroids of time. Neither is a woman's knee so well adapted to standing as a man's. The muscles of her leg have a smaller purchase, hence the leverage between the trunk and the extremities is less. Consequently the strain of supporting the body is transferred elsewhere. The pressure of the weight of the body is shifted to the hips which inclose the reproductive organs. Women standing for protracted periods are apt to suffer from congestion of the organs inclosed by the hip bones. Standing and resting on one foot leads to a narrowing of the hips. This is especially liable to occur because so many girls start to work when young. The uterus is apt to be crowded out of place. Menstruation becomes painful and irregular. Investigation shows that at least two out of five married women who were factory girls are treated for pelvic disorders before they are thirty.

The employment of women leads to results other than effects upon the workers themselves. There appears to be a rather definite relationship between the employment of mothers and the infant mortality rate. Two lines of evidence in support of such relationship may be cited. One of these is the high rate in industrial towns, particularly in textile towns, where women are employed on a large scale. "The relationship of women in industry to infant mortality is so constant," said Dr. Levy several years ago, "that I have found it safe to estimate the infant mortality rate of a city by the character of its industry, and it is safe to anticipate a high infant mortality rate when we know that a community contains an industry which offers employment to unskilled female labor. . . . It will be found, for instance, that little communities on the eastern border of Pennsylvania have had an increase in infant mortality rates during the past five or ten years. A partial explanation will be found in the fact that during this period

some of our silk industries of Passaic and Paterson, on account of labor difficulties, have moved into eastern Pennsylvania and brought with them greater prosperity for the towns of eastern Pennsylvania—and greater destruction of infant life. The one thread running through all the mass of contradictory statistics on infant mortality will be found to be conditions, like industry, that interfere with maternal nursing and mothering." [1]

The second line of evidence in support of this relationship is to be found in the variations within the same town on the basis of the degree of employment of mothers. The Children's Bureau studies of infant mortality contain ample data on this point. In each town the infant mortality rate among children born to wage-earning mothers is higher, and considerably so, than for non-wage-earning mothers. In Manchester, for example, the rate among infants born to women with no employment save household duties was 122, while for those born to mothers employed outside of the home it was 312.9.

"Provision for the protection of women in industry is less adequate in the United States than in other great industrial countries. In 1906 all the countries of Europe, except four small nations, signed the 'Berne International Convention' prohibiting night work for women, but in 1922 only nine of the forty-eight states in this country had passed similar laws. Massachusetts, New York, Missouri, Connecticut, Washington, and Vermont have legislation prohibiting the employment of women immediately before and immediately after childbirth, but only these six states; and only Pennsylvania and New York prohibit the employment of women in dangerous lead industries." [2]

SUMMARY

The factors which have just been alluded to are some of the more important ones emphasized in relation to health at this particular time. Many others should be included,

[1] Levy, Julius, in *Annual Reports, National Conference of Social Work*, Chicago, 1919, p. 205.

[2] Moore, *op. cit.*, p. 350.

such as intemperance, ignorance, irregularity of employment, etc. The foregoing discussion is meant to be suggestive, not comprehensive. Every circumstance in man's mode of living is a factor in his quest for health. Health demands right living, and the opportunities for right living are conditioned constantly and intimately by the arrangements under which men live and earn their livelihood. Certain factors are of particular importance at the present time. The people of our Western civilization are engaged in a vast and dramatic experiment. Man is a very old-fashioned animal trying to live in a new-fashioned world, in a manner that no animal ever before adventured. So unnatural and so ill-adapted to his constitution and its requirements is this New World that it raises seriously the question as to the ultimate outcome. We are by nature tropical, or at least semi-tropical, active, open-air animals. Now we are crowding together in congested cities, living an artificially-housed life, at work in vast enterprises where until yesterday no thought was given to elemental biologic requirements, both life and work becoming increasingly sedentary. Man stands in pitiful need of a historical perspective of himself and his problems. This is as true in the field of health as in any one that may be conceived.

There is no getting away from the fact that the social and economic conditions of the masses must be improved before any great gain in mortality and morbidity rates can be expected. Science has shown the way; it remains for society to apply the knowledge. Social justice is a part of the program of preventive medicine.

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CHAPTER XVII

THE EVOLUTION OF THE MODERN PUBLIC HEALTH MOVEMENT

Man has always been interested in being well. Since the dawn of civilization there has been nothing, when sickness came upon him, which he has refused to do to obtain health. He has been willing to be half-drowned, to be pierced with needles and branded with hot irons, to be buried in the earth up to his chin, to have leeches suck his blood, and to swallow vile-tasting concoctions—all in the hope of regaining his health.

These early efforts failed, not through want of earnestness, but because of lack of understanding. The health measures of former ages, humorous and crude though they be, were entirely logical on the basis of prevailing ideas. The error was in the original premise, not in the logic of its application. Modern man is successful only because a French chemist, within the memory of man, discovered the real causes of disease. Other scientists have built upon the foundations which he laid, so that now we have proven methods which, if properly applied, will prevent disease and lengthen life.

There were, to be sure, a few transitory gleams of an intelligent approach before Pasteur. The Jews grasped the idea of contagion, and two long chapters in the Book of Leviticus are given over to the treatment of lepers and the elements of a sound system of isolation and quarantine. The Greeks developed their games, attempting to secure health from physical vigor. Among them the pursuit of personal hygiene was developed for the first time, and to a degree never again approached. The Romans sought health in their temples, meanwhile constructing great aqueducts and sewers which are monuments to sanitary engineering.

But the promise of these beginnings was forgotten in the

intellectual darkness of medieval Europe. "The decay of hygiene and sanitation at this period was associated with a very positive and definite reaction from the personal luxury and the pomp of statehood of Pagan Rome, which to the mind of the Early Church were symbols of the moral and spiritual corruption which accompanied them. 'The body no doubt had been the spoiled child of imperial Rome, and a frequent fate of spoiled children was now to come to it in the form of neglect and humiliation. In reaction from the Roman thermæ, associated as in memory they were with the whole fabric of Roman luxury, bodily cleanliness fell out of favor and a cult of bodily uncleanliness began; while also, in reaction from the Roman sumptuosities of food and clothing, the most meager diet and the poorest dress were deemed the fittest for all men to adopt.' In the words of St. Jerome, 'Does your skin roughen without baths? Who is once washed in Christ needs not to wash again.' "[1] The medieval peoples searched for the elixir of life through "the charms of the sorcerer and the mystic symbols of the alchemist."

THE BEGINNINGS OF THE MODERN PUBLIC HEALTH MOVEMENT

The public health movement as an effort to control the conditions of life is of comparatively recent origin. It was a product of the first half of the nineteenth century. Several tendencies dominating that general period were responsible for its birth. One of these was the development of the modern scientific spirit, with its emphasis upon cause and effect, and the idea of control of the circumstances of existence which found such a striking illustration in the discovery of vaccination by Jenner in 1798. Another factor undoubtedly was the modern humanitarian movement, springing up out of the seeds of French liberalism, flowering in the emotionalism of Methodism, and evidencing itself in the work of John Howard in prison reform and in the protection of the industrial workers of England under the leadership of the Earl of Shaftesbury and others. Finally, there was the stern factor

[1] WINSLOW, C.-E. A., *The Evolution and Significance of the Modern Public Health Campaign*, p. 4.

of necessity. The grosser forms of sanitary neglect in the new and rapidly growing industrial cities were like the river Thames in the summer of 1858, when, we are told, it stank so badly as to "rise to the height of an historic event."

Two Pioneer Health Workers.—The two men whom we usually identify as the fathers of the modern public health movement were Sir Edwin Chadwick and Sir John Simon.

Chadwick (1800-90) was an Englishman, a lawyer, and a keen student of social problems. While serving as secretary of the Poor Law Commission in the fourth decade of the last century, he was impressed with the connection between poverty and disease, and he began to insert into his reports the suggestion that something be done to control epidemics, that the amount expended for relief might be diminished. "For the first time in the history of England he employed physicians to study systematically the sanitary conditions which might contribute to ill-health, and a resulting report by Dr. Southwood Smith 'on some of the physical causes of sickness and mortality to which the poor are particularly exposed, and which are capable of removal by sanitary regulations' is one of the classics of sanitation. . . . The studies of 1838 led in 1842 to a three-volume report of the Poor Law Commissioners to Parliament. The synoptical volume on the *Sanitary Condition of the Labouring Population of Great Britain* was the work of Chadwick himself and its clear and forceful exposition of the insanitary conditions which existed in all parts of England, of the burden of sickness and poverty resulting therefrom, and of the necessity for the construction of sanitary works, produced a profound impression. It is said that 10,000 copies of it were distributed (an enormous circulation for the time), and in 1843 its influence led to the appointment of a special royal commission on the health of large towns and populous districts. The reports of this Health of Towns Commission in 1844 and 1845 initiated the movement for water supply and sewage disposal throughout the world." [1]

Simon (1816-1904) was appointed, in 1858, as Medical Offi-

[1] WINSLOW, *op. cit.*, pp. 19-21.

cer of Health in London, the second such official to be appointed in England. An excellent administrator, he was markedly successful in cleaning up the municipal area under his care. In 1855 he was called to the newly created office of Central Medical Officer to the General Board of Health, which position he held, despite various administration changes, for twenty-one years.

Simon's chief contribution lay, however, in his work as a teacher of the gospel of health. His administrative reports were models of popularization of essential health facts. Given widespread circulation through the medium of the press, they did much to mold public opinion during those years and to break through the average Englishman's insensibility to dirt. It was this change in public opinion which made possible the filling up of what he called the "huge legislative vacuum," in matters of public health, by the passage of a series of laws of which the Great Sanitary Act of 1866 is the most notable. Concerning the general result of these legislative advances, he writes (1868) as follows: "It would, I think, be difficult to overestimate, in one most important point of view, the progress which during the last few years has been made in sanitary legislation. The principles now affirmed in our statute books are such as, if carried into full effect, would soon reduce to quite an insignificant amount our present very large proportions of preventable disease." [1]

Beginnings in the United States.—In this country, the public health movement began with the report of the Massachusetts Sanitary Commission in 1850. This report, which drew its inspiration chiefly from Chadwick and Simon, was drafted by Lemuel Shattuck, and is pronounced by Winslow to be one of the most remarkable documents in the history of public health. Shattuck's ideas germinated slowly, and in 1869 the Massachusetts State Board of Health, the first in the United States, was established.

Meanwhile, a similar impetus was being given to the development of municipal health work by the sanitary survey of New York City. "At this time the famous Citizens' Associa-

[1] *Ibid.*, p. 23.

tion under the leadership of Peter Cooper was fighting the Tweed ring and in 1864 the attempt was made to secure a health organization for the city in place of the highly corrupt and inefficient force of the City Inspector, then in sole charge of sanitary supervision. On the failure of this effort a sanitary survey of the city was instituted under the direction of Dr. Stephen Smith (later first president of the American Public Health Association, who died a year ago at the age of ninety-one)."[1]

The revelations of this survey were startling: "Domestic garbage and filth of every kind is thrown into the streets, covering their surface, filling the gutters, obstructing the sewer culverts, and sending forth perennial emanations which must generate pestiferous disease. In the winter the filth and garbage accumulate in the streets to the depths sometimes of two or three feet." "The refuse of the bedrooms of those sick with typhoid and scarlet fevers and smallpox is frequently thrown into the streets." "Privies form one of the chief features of insalubrity . . . such masses of human excrements were found on the seats and floors as would justify the locking of the door to protect unwary people." Speaking of cellar dwellings, we are told of some below the high-water mark, so that at high tide "the water often wells up through the floors, submerging them to a considerable depth. In very many cases the vaults of privies are situated on the same or a higher level, and their contents frequently ooze through the walls into the occupied apartments beside them."[2] It is no wonder, in view of such conditions, that the inspectors making this survey should have found over 1,200 cases of smallpox and more than 2,000 cases of typhus fever within two weeks.

The result of this survey was the passage of the Metropolitan Health Law which formed the basis for the sweeping powers later conferred upon departments of health throughout the United States. These two developments, the one state

[1] Winslow, *op. cit.*, pp. 26-27.

[2] *Report of the Council of Hygiene and Public Health of the Citizens Association of New York upon the Sanitary Condition of the City*, New York, 1865.

and the other municipal, constitute the first chapter in the history of the public health movement in this country. By 1878 seventeen state boards of health were in existence, and the movement may be said by that time to have been definitely under way.

STAGES IN THE DEVELOPMENT OF THE PUBLIC HEALTH MOVEMENT

Empirical Sanitation.—With the exception of the longer vision of a few of its leaders, public health work, in the first stage of its development, concerned itself primarily with the problems of environmental sanitation. The period covers in general the years from 1840 to 1890, and its chief gains were in the elimination of some of the more obvious and grosser forms of community uncleanliness. While it is apparent that much of the work done was devoid of any sound scientific basis, its achievements are not to be despised, for they represent the necessary prerequisite to the more splendid progress which was to follow.

"To a large section of the public," says Winslow, "I fear that the health authorities are still best known as the people to whom one complains of unpleasant accumulations of rubbish in the back yard of a neighbor—accumulations which possess those offensive characteristics which somehow can originate only in a neighbor's yard and never in one's own. Sanitation, the maintenance of cleanly and healthful environmental conditions, does indeed represent the first stage in public health. When Sir John Simon initiated the modern public health movement in London three-quarters of a century ago his primary task was the elimination of the masses of accumulated filth which kept alive the pestilences of the Middle Ages. When General Gorgas undertook the task of making safe and feasible the building of the Panama Canal he was in the same way confronted with problems that were primarily those of environmental sanitation. The removal of excretal wastes, the purification of sewage, the protection of water supplies, and the elimination of conditions which permit the breeding of insect carriers of disease—these are

always and everywhere the first tasks for the public health expert; and in the early phases of the public health movement in any country it is natural to visualize public health, primarily in terms of sanitation." [1]

The Golden Age of Bacteriology.—The second stage in the development of the public health movement was dominated by the bacteriologist rather than by the sanitary engineer. The work of Pasteur revolutionized the conception of disease, and the methods of approach as well. Furthermore, as the aims of sanitation are realized in any given community, and the water-borne and insect-borne diseases are brought under control, the more baffling maladies spreading from one individual to another take first rank among public health problems. As a result, the chief emphasis comes to be upon the control of infections transmitted from one person to another.

"The leaders of the public health movement in the United States fifteen years ago were concerned primarily with problems of this sort. Their interest lay in the detection of incipient cases and of well carriers—those individuals who, while in normal health themselves, are cultivating and distributing from their bodies the germs of specific communicable diseases —in isolation, in bedside disinfection, in the breaking by any possible means of the vicious circle which transfers the discharges of the infected individual to the mouth or nose of the susceptible victim.

"In the case of certain of the acute communicable infections we are fortunately able to invoke another weapon against our microbic enemies, by the prophylactic or the therapeutic use of vaccines and immune sera, and so far the production of artificial immunity against attacks of the microbes of disease has proved on the whole more effective than our attempts at breaking the chain of contagion by isolation and disinfection. Smallpox, for example, has dwindled from the position of the chief pestilence menacing the human race to almost the condition of a medical curiosity, solely and directly

[1] Winslow, C.-E. A., "The Untilled Fields of Public Health," *Science*, February 9, 1920, p. 24.

as a result of the use of vaccine. Typhoid fever has been practically eliminated from the army by an analogous procedure. Antitoxic serum has placed the control of diphtheria within our grasp and diphtheria persists as a cause of death simply because of the failure to recognize the disease with sufficient promptness and to apply the protective measures at our disposal.

"In general this second or bacteriological phase of the public health movement, while it can boast such remarkable achievements as those to which reference has just been made, is still far from the complete success which has attended the applications of environmental sanitation. It may be stated with some confidence that there is not one of the diseases originating in the non-living environment which we do not know how to control and which it is not entirely practical to control, given adequate funds and personnel. Before some of the contact-borne diseases, on the other hand, we still stand almost helpless. We may be able to reduce the death rate from pneumonia by the use of protective vaccines, but there has been as yet no actual victory won sufficiently clear to admit of statistical demonstration. We can do much to mitigate the after-effects of infantile paralysis, but we have no effective method of controlling its spread. Before the ravages of a pandemic of influenza, such as swept the world in 1918, we are still practically without defense. Sanitarians have been accustomed to quote with horror the fact that bubonic plague killed 6,000,000 people in India during a period of ten years. Influenza carried off more than this number of persons in India in the four autumn months of 1918, and if this should happen again next year we should still be powerless to help.

"There is much then to be done in the field of the community infections, many problems yet to be solved by the bacteriologist and serologist, before this group of diseases will pass under our control." [1]

This second period, of scientific control of communicable disease by the applications of bacteriology, covered the years

[1] WINSLOW, *op. cit.*, p. 25.

from 1890 to about 1910. These two decades form a golden age in the history of public health. However numerous and important the problems which remain to be solved, no previous period of twenty years ever witnessed equal progress in the control of disease, and it is doubtful if any similar period in the future will see quite such phenomenal achievements.

Education and Personal Hygiene.—As time went on, it was observed that in the two aspects of public health work which overshadowed all others—the anti-tuberculosis movement and the campaign against infant mortality—the part played by sanitation and bacteriology in the narrow sense was a relatively small one. Experience with both tuberculosis and infant mortality convinced workers that, while neither sanitation nor the applications of bacteriology could be ignored, the chief hope of success in dealing with both problems was largely a matter of giving information and teaching adults and children proper habits of living. From a consideration of these facts there emerged a larger program, in which the earlier emphases became but incidents, a program with characteristics "so outstanding and so different from all that went before, as to constitute a wholly new chapter in the history of preventive medicine." [1]

This new program, the third phase in the evolution of public health work, aims then at nothing less than a reform in personal hygiene. And since personal hygiene is largely a matter of proper public health education, the public health movement of today has become preëminently an educational campaign. Alongside of the sanitarian and the bacteriologist, there emerges a new figure of supreme importance—the teacher of personal hygiene.

"Education then is the keynote of the modern campaign for public health. Tuberculosis and infant mortality are preeminent among all the causes of preventable disease and death as the two greatest scourges, from the abatement of which the largest results for humanity are to be obtained.

[1] Winslow, *The Evolution and Significance of the Public Health Campaign, op. cit.*, p. 49.

In each case, the fight must be won, not by the construction of public works, but by the conduct of the individual life. The same thing is true with regard to the spread of the acute contagia, the burden of venereal disease, the obscure ill effects of defective eyes and ears and teeth, and a dozen other problems which in greater or less degree concern the public health. In every one of these cases the results we are striving for can only be reached by spreading a clear knowledge of the ways in which disease spreads, and the ways in which it is prevented, among the mothers who bring up the babies and the men who pay rent in the tenements and work in the stores and factories." [1]

CHANGING OBJECTIVES IN HEALTH WORK

Along with this evolution in the methods of approach, and to a certain extent responsible for it, there have been similar changes in the objectives sought. The first purpose of the public health campaign was the control of epidemics and contagious diseases. This was "after the fact" work, and was justified as a legitimate exercise of the police power of the state.

Experience in attempting such control led naturally in time to the ideal of disease prevention. Following the birth of this idea in health work, there was a good deal of discussion about preventable deaths, preventable sickness, and the preventable waste involved. The report on "National Vitality" by the National Conservation Commission in 1909 marked the high tide of this idea.

Gradually it has come to be seen that the prevention of disease, commendable an ideal as it was, did not go far enough. Even if Pasteur's faith that it is within the power of man to banish infectious disease from the world were vindicated, the result would still be negative rather than positive. And so it is coming to be seen that nothing short of the positive ideal of keeping all people well is worthy of a real public health movement.

[1] Winslow, *op. cit.*, p. 55.

In thus calling attention to the successive changes which have taken place in public health work during the course of its history, it is not meant to imply that later developments displace those which have gone before. Environmental sanitation needs to be controlled, even though atypical cases and carriers of disease are identified; the administration of vaccines and serums continues to be necessary, despite progress in the reconstruction of habits of personal hygiene; health education is imperative, even after sanitation and bacteriology have done their utmost; and it is impossible to keep people well unless epidemics are controlled and disease is prevented.

The public health movement of today represents the sum total of all the methods used and the objectives sought throughout its history. Its development is cumulative, not kaleidoscopic. This cumulative aspect is indicated clearly in the standard definition of public health, as formulated by Winslow. "Public health," he says, "is the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will insure to every individual in the community a standard of living adequate for the maintenance of health." [1]

It is obvious that in speaking of public health, thus conceived, we are considering a social rather than a medical movement, a field of social activity rather than a concrete intellectual discipline or a narrow professional specialty.

Public health originated in a sort of "No man's Land" between social work and the medical profession, and the earlier patrols penetrated into this area from a number of

[1] WINSLOW, *Science, op. cit.*, p. 30.

intrenched professional quarters. Chadwick was a lawyer and a student of social problems; Simon was originally a lecturer on pathology; Shattuck was a statistician; Pasteur was a chemist. Throughout the entire history of the public health movement, it has drawn freely upon the resources of engineering and statistics, of chemistry and bacteriology, of physiology and sociology, of pathology and epidemiology, and upon these basic sciences has built a comprehensive program of community service. This at once is its peculiar problem and its particular strength.

HEALTH ORGANIZATIONS

Private Organizations.—As has been intimated, most of the permanent and constructive movements in public health work have resulted from private initiative, and while the tendency is to assimilate these into public or official policies as they prove their worth, there are some very important private health agencies in existence at the present time.

Private health organizations divide themselves somewhat naturally into two main groups. The first group includes those which have been organized to combat specific diseases or groups of diseases. Of these the most important are the National Tuberculosis Association, whose work has been described already; the American Child Health Association, the result of an amalgamation in 1922 of the American Child Hygiene Association and the Child Health Organization; the National Committee for the Prevention of Blindness; the National Committee for Mental Hygiene; the American Social Hygiene Association; the American Society for the Control of Cancer; and the National Association for the Prevention and Relief of Heart Disease.

The second group of private agencies consists of those which essay a broader program of disease prevention and health promotion. Chief among these are the International Health Board of the Rockefeller Foundation, the American Public Health Association, the American Red Cross, the American Medical Association, the National Organization for Public Health Nursing, the American Association of Hospital

Social Workers, Community Service, and the National Health Council. The last named is primarily a clearing house composed of ten national organizations, and maintains an information service by which its members are informed regarding the activities of all other members. Recently it has been coöperating with the American Medical Association in conducting a popular campaign for the promotion of the periodic medical examination.

Public Health Agencies.—In health work, as in other fields of social activity, the pioneering must be done by private enterprise. To inaugurate measures for combating the diseases toward which the public is apathetic, to develop public opinion so as to demand the incorporation of such measures into the programs of official agencies—these are the functions of the private health agency. Beyond these, it can only supplement the work of federal, state, and local governments.

"The protection and fostering of health," says George E. Vincent, president of the Rockefeller Foundation, "are primarily governmental tasks. Only the city, the county, the state, or the nation can exercise the police power and levy the taxes which are essential to successful, efficient administration of health work. Voluntary agencies may support but they cannot replace public authority. Moreover, the international nature of public health calls for the coöperation of governments, which are more and more working together in a common effort to control epidemics, regulate quarantine, standardize biological products and health procedures, and thus gradually create a world health organization." [1]

It is, then, the official agencies of federal, state, and local governments which constitute the backbone of health work in the United States, and if the health problems of the nation are to be attacked in a comprehensive and effective manner, these agencies must be enabled to assume an effective leadership.

The United States Public Health Service.—From 1798 to

[1] VINCENT, GEORGE E., "Public Welfare and Public Health," *The Annals of the American Academy of Political and Social Science,* Philadelphia, January, 1923, p. 37.

1879, the Marine Hospital Service exercised practically all of the federal health functions, and these consisted chiefly of attempts to furnish medical care to sick and disabled merchant seamen. This work was extended gradually as new needs arose. In 1902 an Act was passed changing the name of the Marine Hospital Service to Public Health and Marine Hospital Service, this Act expanding considerably the health functions of the service. Finally in 1912 the name was changed to the present one, with powers granted to "study and investigate the diseases of man and the conditions influencing the propagation and spread thereof."

Under existing authority, the health functions of the federal service may be summarized under the following heads: (1) the protection of the United States from the introduction of disease from without, (2) the prevention of interstate spread of disease and the suppression of epidemics, (3) coöperation with state and local boards of health, (4) investigation of the diseases of men, (5) supervision and control of biological products, and (6) the dissemination of health information and public health education.

It seems clear that Congress intended by the Act of 1912 to make the Public Health Service the principal federal health agency, but Congress has created a number of other boards and bureaus to perform specific health functions. There are about twenty-four other agencies in the federal government dealing with some aspect of public health. These agencies are scattered about in the different administrative departments. The Public Health Service itself is in the Treasury Department. The Children's Bureau, much of whose work has been in the field of child hygiene, is in the Department of Labor. The division of Vital Statistics is in the Department of Commerce. The division of School Hygiene is in the Bureau of Education, of the Department of the Interior. The Geological Survey of the Interior Department conducts investigations of water supply. In the Department of Agriculture are the Bureau of Chemistry, in charge of the administration of the Pure Food and Drugs Act; the Bureau of Animal Industry, which deals with diseases of animals, some of which

have a direct relationship to human diseases; the Bureau of Entomology, which studies insects affecting the health of animals and crops and incidentally the health of man; the Biological Survey, which has rendered effective coöperation in the eradication of rats and plague-carrying ground squirrels; and the States Relation Service, which has done effective work in the instruction of persons living in rural communities regarding problems of sanitation and personal hygiene. The Post Office Department has an officer in charge of violations of the law prohibiting fraudulent advertising. Finally, the War Department does considerable research work in the field of disease-prevention, under the direction of the Surgeon-General of the Army.

Since most, if not all, of these functions are authorized also for the Public Health Service, it is inevitable that there should be overlapping in the functions of these bureaus and divisions, with considerable confusion of effort and duplication of work. Obviously the several branches of public health work are so intimately related that separate bureaus cannot work to the best advantage. Moreover, it is extremely doubtful whether the Public Health Service can function to its best advantage as long as it is, as at present, under the administrative control of an Assistant Secretary of the Treasury, "who is also responsible for a mass of executive work, which a late incumbent described as 'a man's-size job in itself.' This official came in contact with the Secretary of the Treasury several times a month and had a multiplicity of affairs to discuss with him apart from those of the public health service. The Surgeon-General is in charge of the technical administration of the service, but it is quite evident that these activities which are of such tremendous importance to the whole people are not adequately cared for in a ministerial sense or properly adjusted as to their contact with the legislative branch of the government where appropriations must be sought for carrying on the work." [1]

The simple fact is that there is today no central authority coördinating the work of the states, supervising the health of

[1] Fisk, *op. cit.*, p. 372.

the people as a whole and unifying and simplifying the central agencies working in this behalf. "The first essential, therefore," says Fisk, and in this he voices a general conviction, "is a federal department of health with a secretary of health in the Cabinet. Appropriations for labor, commerce, and agriculture are more readily secured because there is a secretary to represent the interests of each. But there is a comparative indifference in federal circles generally to the important problem of health which reacts on the states, on the community, and on industry. This indifference, or, at best, interest localized in subsidiaries of the various departments, must give way to leadership and coördination of federal health activities."[1]

State Departments of Health.—Under our system of government, public health is largely a function of the state, and all states have some kind of health department. These departments are ordinarily under the control of a commissioner who is appointed by the Governor. "They (the commissioners) receive their power from the state legislatures and as a consequence their functions vary considerably in different states. In the more progressive states their powers and functions are broad and their control over community health is considerable. In other states their duties are confined almost entirely to the recording of statistics and more or less perfunctory efforts to control disease. In many states the health departments are notably lax, so that statistical data, even in reference to births and deaths, are so incomplete as to be without value."[2]

Up to the war period, the trend in the administration of public health work was toward the centralization of authority and leadership in state organizations. Until recently, however, "it has been very difficult to organize an efficient state health department. There have been several reasons for this. In the first place it has been difficult to get sufficient appropriations so that the department is frequently limited in its activities because of lack of funds. In the next place the

[1] Fisk, *op. cit.*, p. 370.
[2] Burnham, *op. cit.*, p. 33.

health laws are often not correlated, the powers of the department being limited, and health functions often divided among several different commissions. And finally it has been difficult to secure efficient health officers because positions are frequently under political control and the financial rewards are much less than could be obtained from private practice. In spite of these difficulties there has been a steady advance in the standing of the health departments and within the last few years certain states, notably Ohio and North Carolina, have undertaken progressive measures for the state-wide improvement of public health."[1]

While departments in particular states will develop ambitious programs, on the whole the development of state departments of health in the future lies probably in the direction of perfecting control over communicable diseases, especially during epidemics; in the collection and improvement of vital statistics; in the maintenance of diagnostic laboratories; and in furnishing antitoxins free or at cost.

Local Health Departments.—Since the war, the tendency has been to build up the city and county health organizations for work which they can handle effectively. As a matter of fact, it is in the local community that the details of a public health program must be worked out.

The problem of local health administration is a dual one. In the first place, there is the matter of finances. The amount spent for public health in American cities varies from less than one cent per capita annually to more than a dollar. A survey of 83 of the largest cities in the United States, conducted by a committee of the American Public Health Association during 1920-1, showed that an average of 52 cents per capita was spent for strictly public health service.[2] This is considerably less than is spent for other purposes. The Bureau of the Census obtained reports from 183 large cities in 1921, showing a per capita expenditure of 71 cents for health, $10.62 for education, $2.57 for the fire department, $2.08 for

[1] BURNHAM, *op. cit.*, p. 33.

[2] "Report, Committee on Municipal Health Department Practise," *American Journal of Public Health*, January and February, 1922, pp. 7-15, 138-147.

charities, hospitals, and corrections, and 99 cents for recreation.[1] The appropriating bodies of local, as well as of state and federal, governments are keeping appropriations for public health low because in recent years there has been a rising tide of protest against burdensome taxation. And it is difficult to convince taxpayers of the validity of new appropriations when the money must be expended so largely for personal service. Moreover, the results of such work are often difficult to visualize. The health officer of today must do educational work in more ways than one. He must educate public opinion to support his work by showing what can be done with small appropriations, and that money spent for the prevention of sickness is to be looked upon as insurance against diminished disability and its equivalent financial loss.

This leads directly to the second part of the problem, that of personnel. And it is a vicious circle, since personnel is to a large extent a matter of finances. The salaries of city and county health officers are low, and this situation has resulted frequently in inefficient work. Lack of proper training and the selection of personnel on the basis of political manipulation have been additional factors. The present tendency is toward the concentration of public health activities in communities large enough to secure the services of a full-time medical officer. One of the most difficult problems in public health administration at the present time is, therefore, the working out of some plan whereby the smaller municipalities will obtain a better health service than they have hitherto enjoyed.

PUBLIC ECONOMY AND PUBLIC HEALTH

Public health is purchasable. What this means is that a community can improve its health conditions to the extent that it is willing to pay the cost. The conquest of disease and physical disability is today largely a matter of available funds. The appalling waste of human life, now known to be

[1] *Bureau of the Census, Financial Statistics of Cities*, 1921, pp. 96-97.

so unnecessary, will continue until this fact is understood by the people and their appropriating representatives.

What are the facts? Our tax bill, local, federal, and state, for 1923 was in round figures $8,000,000,000. The total expended by all official agencies for health service in the three preceding years averaged annually only slightly more than $60,000,000. The total appropriations of Congress in 1924 were about $3,400,000,000, of which one-fifth of 1 per cent was available for distinctly public health activities. At the same time the people of the United States were spending more than a billion dollars a year for hospital service, physicians, healers, and nurses, and about $350,000,000 for drugs.

"Surely a nation rich enough to spend over $1,800,000,000 a year on tobacco and $800,000,000 on confectionery would be willing (were the people persuaded to reflect upon the situation) to spend more than a paltry $60,000,000 per year on its official health agencies. The most that can be said about chewing-gum is that it probably does not do much harm; some physiologists believe that it has a detrimental effect on the digestive processes. Yet the people of the United States are paying each year more money for chewing-gum than they appropriate through legislative bodies to all official agencies for public health activities. What would future generations say when they contemplate this fact, and when they observe that we are now spending even more for perfumery and cosmetics?" [1]

Health is purchasable. Within natural limitations, a nation, a state, a community, may determine its own death rate, its own morbidity rate, its own rate of positive physical well-being.

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CHAPTER XVIII

SOME ASPECTS OF THE MODERN HEALTH MOVEMENT

It is at once the peculiar promise and strength of the public health movement that it is attacking its problems in many ways and at diverse points. Many different experts, of fundamentally distinct training, are contributing their special resources to the common task. If, on the one hand, this makes for some confusion and duplication, it cannot but increase the effectiveness of the movement as a whole.

The details and the relative value of health activities vary with location, character of population, and stage of civilization. In some communities malaria, dysentery, hookworm, or yellow fever will need chief consideration. On the other hand, a well-sewered city will need, and can afford money for, lines of work which in less fortunate places must be devoted to the task of privy sanitation.

The purpose of this chapter is to consider some of the fundamental aspects and problems of present-day health work, and to review the concrete agencies and measures which are being utilized as well as some of the more apparent needs for its increased effectiveness.

VITAL STATISTICS

It is the unanimous opinion of all practical workers that accurate and complete vital statistics are the first essential in an intelligent public health campaign. This is simply analogous to saying that it is necessary to secure the facts before an intelligent program can be constructed, and to check up results if it is to be made effective.

The statistician is the bookkeeper of public health. Or, to change the metaphor, he is the physician who keeps his finger on the pulse of the nation's health. Or, to make still another comparison, his correlations and analyses are like the

army officer's map of terrain. "He is, or will be," says one epidemiologist, "guide, map-maker, intelligence department, all in one; he is, or will be, like the cost-of-production scientific manager of modern business, 'the most indispensable man on the staff.'" [1]

Vital statistics are not of recent origin, but the development to their present form and the appreciation of their value are comparatively modern. Earlier statisticians have been referred to as "helpless old gentlemen, raising their feeble voices in very feeble chants. A dry-as-dust historian of the wars of ancient Greece would lend more aid to a modern football team than the old-time statistician furnished to public health endeavors." [2]

In the development of statistical data of all kinds, the United States lags behind most other civilized nations. It is rather humiliating to recall that in 1916 Sweden had compiled a life table for the United States (1901-10) six years in advance of our own table and closely approximating it. Some one has made the cynical remark that we do not publish statistics in this country, but only books with some figures. Whatever truth there is in this statement applies particularly to our vital statistics. They have been the Cinderella of public hygiene, sitting in the corner and sifting the ashes of dusty and incomplete figures while her proud sisters, Bacteriology and Sanitation, have gone to the ball and talked about the wonderful things they have done. Today, despite recent progress, less than thirty states, including less than 85 per cent of the population, are included in the registration area for mortality statistics. This means that the federal bureau finds the reporting too bad to be useful in the states not included.

The immediate task in the field of vital statistics is to secure accurate and complete mortality data for the entire country. Furthermore, a commission of statisticians, actuaries, physicians, and leaders in public health education should be assembled to study critically the information now ob-

[1] Hill, *op. cit.*, p. 134.
[2] *Ibid.*, p. 134.

tained and to determine what revision should be made in the tables now presented and what additional information should be secured. Existing methods of classification of causes of death are open to objection as frequently obscuring the real causative factor. "As a practical illustration of the confusing implication conveyed by existing classifications, we may cite a recent case in Texas where the judge held that salpingitis (an infection of the fallopian tube leading to the ovary in the female) is a disease that can also affect a male within the meaning of an insurance contract. Thus a layman passing on the fundamental factors involved rightly concludes that the essential condition is an infection and that such infection might affect the fallopian tube, the eustachian tube, or any other tube in the body, and that the real disease is not an entity, salpingitis, but an infection localized in the fallopian tube. Asthma is listed as a 'disease' of the lungs, but it is really a symptom resulting from many possible factors such as protein sensitization, circulatory or kidney trouble." [1]

There is great need for more adequate morbidity statistics. In 1884 Massachusetts enacted a law requiring the reporting of certain communicable diseases, the obligation being placed on householders and physicians. Practically all states today have laws for the compulsory reporting of communicable diseases. A model law was adopted in 1913, and has been adopted by many states. The list now contains thirty-eight diseases. Beyond this, nothing is attempted, and even this limited range of reporting is not complete.

It must be admitted that the collection of reliable morbidity statistics presents formidable problems. The most promising possibility is through the establishment and standardization of proper systems of reporting in large industrial and commercial establishments and the projection of these conclusions to the general population. Some efforts in this direction have been made by the United States Public Health Service. In gathering such data, "more attention must be

[1] Fiske, *op. cit.*, p. 376.

given in classifications to the etiological factor rather than to the symptomatology or pathology by regions. This information is of little value unless it leads us to knowledge of the root causes of the disability or illness and information as to its prevalence. Without such information remedial or preventive measures must always lack efficiency and precision." [1]

There is absolutely no excuse for the lack of birth statistics. All programs for the reduction of infant mortality give first place to this need. "The health department needs to know of a birth the very day that a child is born in order to save the 43 babies out of every 1,000 that die before they are one month old. Reporting of births too late for follow-up work to be done is a waste of money and of life itself. Voluntary agencies, Boy Scouts, Girl Scouts, and committees of women's clubs can aid in correcting the birth registration, and prosecution and heavy fines for non-reporting would result in a tremendous improvement in prompt birth registrations." [2]

It is not sufficient to gather the ore, it must be refined. If vital statistics are to serve their purpose, they must be arranged, classified, and presented so as to be intelligible to the average person. The camouflage of higher mathematics, with which some of its zealous devotees have surrounded it, is not necessary in discussions of vital statistics. By using complicated formulæ and stilted terminology, some statisticians greatly restrict the usefulness of their work.

A map, or series of maps, showing where, if at all, the tuberculosis belt, or cancer belt, or typhoid area of a state or the nation is, would be of inestimable value in an endeavor to deal with these diseases. Or, let us assume that infant hygiene work is to be undertaken. Where within a given area do the highest infant mortality rates obtain? How does the present rate compare with those of the last twenty years? Is infant mortality increasing or decreasing? How does this area compare with others? What are the chief causes of

[1] Fisk, *op. cit.*, p. 381.

[2] Armstrong, *Community Health*, Funk & Wagnalls Company, New York, 1924, p. 15

infant deaths? Does any one group of causes account for the higher rate in a given area? All of these are questions which are possible of answer. They must be answered if the program to deal with the problem is to be intelligent.

If statistics are to be made to mean anything, it is necessary to have competent statisticians. A mass of facts about deaths and diseases without a trained statistician is like a mass of paint and a canvas without an artist. Like the artist, a properly qualified statistician, by making a free and constructive use of his material, can paint a picture—with vital statistics, a picture of the life history of a people. There is a very real need in this country for a group of trained professional statisticians in the public service, who will know what data are to be collected, and what is to be done with them after collection. Hardly a health department now in existence collects in full or uses more than a fractional part of the information that is really needed.

SANITATION

Municipal or community house-cleaning has been referred to as the first stage in the development of public health work, and even though our interests have gone considerably beyond this original emphasis, it must not be forgotten that cleanly surroundings are fundamental to all latter efforts, and that constant attention is necessary to maintain the environment in a healthful condition.

Two further developments in the field of sanitation in recent years should be noted. One of these is the getting away from broad generalizations and general programs, and a recognition of the specificity of cause and effect—*i. e.*, a discovery of the fact that each separate factor in each particular problem must be met with a specific measure. The other development involves a broadening of the concept of sanitation so as to include the social and economic factors in group life. "It is becoming increasingly evident," says Moore, "that the sanitarian of the future must take into consideration the economic and social causes of disease and coöperate

with those whose chief concern is the elimination of adverse social and economic conditions." [1]

"The sanitarian of the future must be more than a bacteriologist and a hygienist and an engineer and a statistician. He should have at least a basic knowledge of economics and sociology; he must know the chief facts in regard to labor, the distribution of income, poverty, housing, prostitution, recreation, eugenics, and allied questions, together with recognized principles and laws in these fields. For an understanding of these problems, a knowledge of modern psychology is also necessary. As a sanitarian, he may not be able to raise wages and regulate the employment of women and children, but if he is informed regarding these aspects of public health, when he is called upon for advice as an individual or as a member of a commission, being free from the prejudices which limit the usefulness of most uninformed persons and being guided by his enlightened interests in the welfare of the community, he will occupy an enviable position of usefulness." [2]

PERIODIC HEALTH EXAMINATION

The periodic health examination is the keystone in the new science of preventive medicine. It may be defined as a complete examination held at stated intervals and without regard to the condition of the health of the individual. The principle involved is a sound business practice, thoroughly established. The successful merchant takes stock or inventory at stated intervals to learn how his business stands. Banks insist on balancing accounts frequently. Automobile owners have learned the wisdom and economy of periodic inspection and overhauling. The wise engineer does not use his machine until a breakdown occurs, but inspects it regularly so as to detect early signs of wear and tear. It should be the common practice to treat similarly the greatest machine of all—the human body.

The need for such examinations is indicated by the large

[1] Moore, *op. cit.*, p. 7.
[2] *Ibid.*, p. 372.

number of impairments found whenever they are made. This was shown on a large scale in all countries involved in the World War. The results of our own experience in the drafting of several million men has been alluded to. The Life Extension Institute has been very active in the inauguration and promotion of the movement, and the idea is rapidly in process of being sold to the American public. Insurance companies are offering physical examinations without cost, as well as other health service to their policy-holders; an increasing number of industrial establishments are recognizing its value, by way of increasing the efficiency of their workers; military authorities are applying the practice rigorously to the members of their units; and considerable progress has been made in its extension to the pupils in the public school system. In addition to the large number of individuals reached through these channels, the educational effect upon persons not included is widespread, and each year more and more persons, of their own volition, submit themselves to it.

Periodic health examinations serve a double purpose. In the first place, they make it possible to check the growth of certain diseases which develop unnoticed from their outset. Many of the chronic diseases have an insidious beginning, slow but progressive, and often are unrecognized until a point has been reached in their development when therapeutics are powerless. Especially is this true of the degenerative diseases, whose growing importance has been indicated. In order to meet this situation constructively, all the recent measures of early diagnosis, obscure symptomatology, the slightest physical-chemical reactions in blood infections and in the organs, should be known and utilized. This cannot be done until the periodic and systematic health examination becomes a regular practice. The second outstanding value of periodic examination lies in the fact that it furnishes the basis for personal hygiene work. Theoretically, there are general rules of hygiene applicable to all persons; practically, it is found that hygiene is really personal—*i. e.*, that it must be adapted to the particular needs of the individual. Only

an individual examination, repeated at intervals, will furnish the facts necessary to individualize hygienic instruction.

Evidence is accumulating rapidly that this common-sense method generally applied and followed by necessary remedial treatment and regulation of personal hygiene will do more to prolong health than any other measure. Interesting testimony of its practical value is to be found in the experience of the Metropolitan Life Insurance Company, which, since 1914, has made it possible for policy-holders to avail themselves of the services of the Life Extension Institute. A careful study made on the policy-holders who took advantage of this opportunity during the first two years had led to the conclusion that the company, "on this particular group of policy-holders, had its principle returned and made a gain of about 200 per cent on its investment during a period of approximately five years." [1]

The real question about periodic health examinations is not that of its value, but of its practical development. Dr. Fisk, of the Life Extension Institute, suggests five ways: (1) through the training of medical school students to make such examinations; (2) through popular education regarding their value; (3) through the periodic health examination of policy-holders by life insurance companies, as a free privilege to be accepted voluntarily; (4) through the periodic physical examination in industry; and (5) through the establishment of a national department of health to coördinate all health measures and activities.

HEALTH EXAMINATIONS IN THE SCHOOLS

Certainly not the least promising of Dr. Fisk's suggestions is the public school, for it is this agency which comes into contact with practically all members of society during certain age groups covering the years when most effective results may be obtained from periodic examinations. It is necessary, however, to make a clear distinction between medical inspection of school children for the detection of communicable dis-

[1] *Statistical Bulletin, Metropolitan Life Insurance Company*, Vol. II. No. 11.

eases, and physical examination which aims at the discovery of defects and substandard physical conditions. The former relates primarily to the immediate protection of the community, while the latter looks to the securing and maintaining of the health and vitality of the individual. Medical inspection was the first to develop. It began in certain German cities about 1867, spread rapidly over Europe in the two or three decades following, and by the closing years of the century found its way into the larger American cities. It was conceived of, and rested upon the same principle as the quarantine laws, the establishment of pest houses, and compulsory vaccination. Physical examinations, on the other hand, came later, as a partial solution to the dilemma in which school men found themselves as a result of compulsory-attendance laws. Confronted with the necessity of dealing with many children whose school progress was unsatisfactory, some of the more progressive educators, knowing something of the advances in the field of medicine, turned, among others, to the physician for aid. Since then physical examinations have become the most important feature of medical work in the schools.

By 1922, thirty-nine states had school health-supervision or medical-inspection laws; some merely permitting examinations, and others making them mandatory. It goes without saying that they should be mandatory everywhere. Every child, when it enters school, should have a thorough examination, stripped. The mother should be present and be advised regarding the child's condition. Such an examination should be made every two or three years. Beside this, there should be an annual routine examination.

In actual practice, the frequency of examination depends largely upon the financial resources of the school; the nature and value of the examination, upon the physician making it. Physical examination requires a special training and a careful technique. Too few qualified physicians are found in this kind of work, and all too frequently the conditions and system under which they work do not attract the competent.

HEALTH SERVICE IN INDUSTRY

Next in importance to the school in this connection is industry. Industry represents one of the large groups of gainful occupations. It numbers its employees by the millions. It exists in practically every part of the country, and its constant tendency is toward growth and expansion, gathering to itself an ever-increasing proportion of the population. Of the 41,614,248 gainfully employed persons in the United States in 1920, probably 20,000,000 were employed in factories or other establishments in sufficiently large groups to make health service practicable. These represent, together with their families, almost half the population of the United States.

Industrial health service had its beginning in the doctor attached to a timber camp or a mining industry. Such medical attention was a necessity, since frequently such industries were located in remote regions where it was impossible to obtain other medical aid. The service rendered proved so valuable in keeping employees fit that gradually its scope was extended until now there are complete medical service departments attached to all kinds of industries, with a view not only of rendering first aid, but of teaching prevention of sickness and accidents as well. In 1914 a Conference Board of Physicians in Industry was formed. At the 1922 meeting of this organization, the following definition was given of an industrial physician: "The physician in industry is one who applies the principles of modern medicine and surgery to the industrial worker, sick or well, supplementing the remedial agencies of medicine by the sound application of hygiene, sanitation, and accident prevention; and who, in addition, has an adequate and coöperative appreciation of the social, economic, and administration problems and responsibilities of industry in its relation to society." [1]

The functions of an industrial health service, as they have come to develop, are as follows:

[1] KEEFER, G. L., "Preventive Medicine in Industry." *American Journal of Public Health*, December, 1924, pp. 1050-1052.

1. The physical examination of all applicants for employment. This should be given before the employee is hired, in order to determine his physical fitness for the particular job contemplated. Such examination must be different, of course, from that given to patients in a hospital. Special attention should be given to such conditions as heart defects, nephritis, hernia, tuberculosis, syphilis, and the like.

2. The periodic reëxamination of all workers, particularly in cases of transfer from one department to another, or of employees in departments where there is a health hazard, or of workers who have physical defects which need following up. The former two are necessary for the discovery of diseases in incipiency, the latter to stimulate constructive action.

3. The placing of physically defective workmen in departments where the work will not prove injurious. In order to avoid antagonism and skepticism from the workers, great care must be taken to convince them that "the purpose of such examination is not to reject workers (unless they suffer from a disease which menaces the health of other employees) but rather to use the knowledge so gained in doing good placement work. The examination record determines what position should be given an applicant with an impairment, so that the work he is to do will minimize the impairment, or at least not aggravate it. For example, heart disease does not render a worker unemployable. If the work is properly selected, there may be little danger of strain; whereas, if the worker with heart disease was assigned to a job without any consideration of his disability, he might collapse from overexertion in a short time." [1]

4. The diagnosis and, in certain cases, the treatment of all workers who may be indisposed or who apply to the dispensary for medical care.

5. Coöperation, where possible, with the family physician of sick or defective employees.

6. Investigation by nurses of all cases of sickness, as well as general nursing care and advice.

[1] FRANKEL, *op. cit.*, pp. 67-68.

7. Surgical care and treatment, as far as possible, of all workers injured during employment.

8. General supervision of plant sanitation, ventilating, heating, etc.

9. General health education. Health work in industry is rapidly developing, just as health work on the outside has developed, to the point where its chief emphasis is upon education. This is most fortunate, for there seems to be no better place to work out the latest phase of health work than in a well-organized industry. Here is a group which can be controlled, if the employer will it, so as to be taught how to keep well.

Up to 1910, little attention was given to health in industry. Today, few subjects in the field receive more attention. In 1912 the United States Public Health Service formed its division of Industrial Hygiene, now known as the Division of Industrial Medicine and Hygiene. In 1920 an estimate was made to the effect that there were 900 establishments employing 1,500 part-time and full-time industrial physicians. The number since has been increasing steadily. Some of the larger and better known industries doing interesting health work are the International Harvester Company, Montgomery, Ward & Company, The Colorado Fuel & Iron Company, the Goodyear Tire and Rubber Company, the Ford and Cadillac Motor Car Companies, and the Illinois Bell Telephone Company. Although there has been some objection to industrial health work because of its compulsory feature and the possibility of developing a spirit of paternalism among employers, the consensus of opinion strongly supports it.

DISPENSARIES AND CLINICS

The problems involved in the working out of an effective health program are chiefly economic. Many families find it difficult or impossible, because of inadequate income, to secure proper medical attention for themselves. If Michael Davis's estimate for New York City be correct and generally applicable, it appears that about 15 per cent of the population in our cities belong to families whose income makes it necessary

for medical care to be free if it is to be had at all. Moore [1] estimates that an additional third of the population, while able to make some contribution, cannot pay what prolonged treatment or care by specialists demands. The wage and income data cited in an earlier chapter would indicate that such estimates are none too liberal. The exact proportion of these classes in the population is, of course, a matter of minor importance. Such elements do exist, they are not small, the problems they present are serious and urgent, and it is a matter of simple social economy that they be met. It is for this purpose that the dispensary and clinic have come into existence.

A dispensary, as defined by Davis and Warner,[2] is "an institution which organizes the professional equipment and special skill of physicians for the diagnosis, treatment, and prevention of disease among ambulatory patients." A clinic, they define as "a division of a dispensary in which a specified group of related diseases are treated."

These definitions indicate a material departure from the original conception. The earliest dispensaries, as the term signifies, were places for the distribution of medicines to the poor. Their transformation is a part of the fundamental revolution in health work which has occurred, so that now the giving of medicine is but incidental, and their primary purpose is, as stated above, the rendering of medical and health service to patients who are able to be up and about.

The increase in the number of dispensaries in the United States during the last quarter of a century is one of the outstanding features in health work. The first dispensary in the English-speaking world was established in London in 1696; the first in the United States, in Philadelphia in 1786. By 1900 there were about 100; and in 1922, a survey by the American Medical Association placed the number of dispensaries and clinics at 3,369, reaching annually an estimated total of 8,000,000 different persons. Their growth has been particularly rapid since 1910, due chiefly to the influence of

[1] Moore, *op. cit.*, p. 284.

[2] Davis and Warner. *Dispensaries, Their Management and Development*, The Macmillan Company, New York, 1918, p. 27.

recent militant public health campaigns and to the new motive of promoting health rather than of curing disease.

There are several distinct types of clinics and dispensaries. First, there is the general dispensary, or out-patient department of a hospital. Most of the larger dispensaries are of this kind. Some of them are equal in size to the hospitals to which they are attached. Most of them are located in the larger cities, particularly in the East and Middle West. Over against such a large dispensary is the clinic, also the out-patient department of a hospital, but dealing only with one or more specific diseases.

Probably the most significant is the public health clinic or dispensary, whose marked development in recent years is one of the most striking features of the modern public health movement. Most of them are clinics, local in their range of operations, drawing patients from a limited area and confining themselves to a special branch of work, rather than general dispensaries. Many limit their attention to preventive and educational work; others, especially those dealing with specific problems, diagnose and treat disease as well as undertake educational and preventive measures.

The number of kinds of specialized public health clinics has increased as new health problems have come to be recognized as of public importance. Tuberculosis clinics were the earliest to develop and the first to "go out after business." Today, close to a thousand of these are in existence. Next, with the development of the child-hygiene movement, there have come pre-natal, obstetrical, post-natal, pre-school, habit, school children, and other clinics, specialized offshoots from the earlier milk stations and infant welfare centers. In Pennsylvania alone there are today (1925) about 500 well-baby clinics. More recently, and particularly since and as a result of the war, psychiatric, mental hygiene, and venereal disease clinics have multiplied, and their number increases apace. The latest to develop are cardiac, dental, and industrial hygiene clinics.

Under historical precedent, clinics and dispensaries have been thought of from the charity angle, and have limited their

clientele to those who could pay little or nothing for medical service. Today, we are regarding them more and more from the health angle, and extending their use to those who can pay to some extent at least for services rendered. Moreover, there is some doubt if an entirely free clinic is not without its pauperizing effects. In order to avoid such pauperizing influences on the one hand, and the development on the other hand of commercial clinics exploiting quacks and nostrums, there has come the establishment of the pay clinic or dispensary, where a charge is made to meet the cost of the service obtained.

The idea of a pay clinic was worked out first in the eye clinic of the Boston Dispensary, established in 1913. Another well-known illustration is that of the Cornell University clinic, opened in 1921. Most of these pay clinics have been limited thus far to specialities, and where properly conducted and having in back of them a well-known university or hospital or reputable physicians, they are in a position to render a positive service in their respective communities. Great care must be taken, however, to develop and maintain a close coöperative relationship with the local practicing physicians, and in no case should the fee charged be less than that asked for a like service by the family physician.

Reforms Recommended.—The following recommendations have been made recently (1927) in the final report of the Committee on Dispensary Development of the United Hospital Fund of New York City, after a six-year study of dispensary problems:

(1) More pay clinics like the Cornell Clinic, which treats persons of moderate means at cost. Such pay clinics would give adequate remuneration to their physician.
(2) Extension of preventive service through periodic health examinations.
Further improvement in the standards of service in clinics generally.
(3) The establishment of additional clinics in Queens and

in certain districts of Brooklyn in which population is growing rapidly.

(4) More clinics in certain specialties such as dentistry, pre-natal work, and mental hygiene.

(5) The promotion of district health centers, coördinating for a given area clinics now scattered or overlapping in service.

(6) Better teamwork between clinics and charitable agencies to prevent existing waste of effort and money.

(7) Revision of the state dispensary law and continued research in order that the clinics may keep pace with growing needs and changing conditions.

HEALTH CENTERS

There is no generally accepted definition of a health center. Under the simple meaning of the term, they have existed for a long time. Although not called by that name, every hospital, dispensary, or clinic has been a kind of a health center.

Since about 1910, however, the term has come to be applied to certain definite forms of health activities, which in their early development evolved from the dispensary, but which marked a distinct advance in that it applied the dispensary idea to a population group. In other words, instead of caring only for those who came for treatment, it reached out into a definite area and gave intensive health service to all those whom its resources permitted it to handle. This service included preventive as well as curative medicine, and was taken to the homes of the people.

Although of pre-war origin, the health-center movement was much accelerated during the war period. Interest and activity in their establishment was at its height during 1920 and 1921, largely as the result of the decision in 1919 by the American Red Cross that the central feature of its peace-time program would consist of activities in the field of public health, a part of that program being the establishment of health centers in every community where conditions warranted it. By December 31, 1920, there were 385 such centers in operation in

various parts of the United States, the Red Cross being concerned in the administration of all but 60 of these.

What the Red Cross hoped to make these health centers can be gathered from the definition which it gave to them: "A health center is the physical headquarters for the public health work of a community. As such, it is the practical and concrete expression of the interest of the community in the health of its inhabitants. It constitutes a business-like way of associating health activities, both public and private, under one roof, in daily touch and in complete mutual understanding. The health center thus represents the latest step in the evolution of community health work, and answers the demand for efficient conservation of effort in bringing together important but hitherto independent health campaigns, such as those for the prevention of tuberculosis, venereal diseases, mental diseases, industrial diseases, and above all the vitally necessary possibilities of properly relating these volunteer activities to the official health work of the city, county, state, and federal authorities." [1]

What health centers actually are can best be gathered from a review of the more conspicuous types of activities to which the term has been applied. In 1921 Platt found at least five different types:

"Type I, which limits itself to health education along the usual lines of exhibits, talks, literature, and to functions of an information clearing-house character.

Type II, which does the above but also engages in medical treatment of the sick, through various clinics.

Type III resembles a miniature health department, for it carries on in a local district all or nearly all of the functions of the official department of health under a plan of decentralization.

Type IV is radically different in limiting itself to consultative medical diagnosis of the most modern and scientific character, dependent upon a group of experts and primarily designed to aid and educate the less highly trained physician.

Type V is differentiated from the preceding types by reason

[1] *American Red Cross, Circular 1,000,* September, 1919.

of its positive emphasis on the possibility, and the desirability, of good health. It is primarily interested in the well or only slightly indisposed person. It gives careful physical examinations to well people. It is not a dispensary, for it does not give medical treatment. It wishes to create a 'Will to Health.'"[1]

It is apparent, then, that the health center does not represent a fixed ideal, but varies considerably according to the needs of the community, its available funds, and the point of view of the local people inaugurating the movement.

What the health center may become in the future is probably what the best centers are striving to be today—a center organized and supported by both public and private agencies; the coördinating agency of the district and in close coöperative relationship with all the medical, nursing, social, educational, and community interests of a limited population area; carrying on an intensive health-conservation, disease-prevention, and sickness-treatment program, with all the people of the district participating in its work; and above all, an institution from which health influences radiate rather than to which disease gravitates.

THE PHYSICIAN AND PUBLIC HEALTH WORK

The emphasis of the public health campaign has moved steadily from the environment to the individual; its interest has been transferred from the swamp and the dunghill to the control of infections, thence to the detection of physical defects and the hygienic guidance of the individual.

As the emphasis changes, so changes, too, the personnel of the movement. In the former stages of public health work, the engineer, the administrator, the bacteriologist, and the statistician were of primary importance, and, as has been pointed out, it was these rather than the medical men who have been responsible chiefly for the development of the movement thus far. But when the individual becomes the center of attack, with periodic health examination and hy-

[1] Platt, P. S., "Is the Health Center a Health Center?" *American Journal of Public Health,* March, 1921, p. 223.

gienic guidance as the keystone of the structure, there arises, among other problems, that of the relation of the practicing physician to this work, his attitude toward it, and his training for it.

"The more I study Americans," a Chinaman is quoted as saying, "the more I am convinced that they are mentally diseased. Instead of doing everything in a common-sense manner, they try all they can to do it in the very opposite way. At home, for example, you and the other members of your Mutual Health Association would pay Dr. Wun Lung and his assistants each a liberal salary to keep you all well, and pay nothing when you are sick. On this account he and his young men work very assiduously in calling regularly and examining every member of the union, and all of you enjoy comparative immunity from illness. Here in America a physician is paid by the amount of your sickness, and the less you are able to earn any money, the larger and more onerous is his bill. As a result, some doctors, I am told, yield to temptation and keep their customers sick. The consequence is that those who have the largest number of sick and dying are the richest, most esteemed, and influential, while in China they would be ostracized and not allowed to practice." [1]

It happens that this oft-referred-to system of preventive medicine among the Chinese does not exist in that country, but the quotation serves to call attention to the contrast between the aims of preventive medicine and the incentives of private practice. "The average physician practices medicine primarily as a means of livelihood. From the nature of his profession the humanitarian aspect of modern life is seen more clearly than in most other professions, but, in the last analysis, he must receive adequate remuneration or cease to exist. Consequently, he must either devote a small part of his time to patients financially able to pay large fees, thereby permitting him to give a part of his time to charity patients from whom he obtains his fund of clinical experience, or he must make a large number of visits upon patients able to pay a small or

[1] Quoted by Moore, *op. cit.*, pp. 373-374.

moderate fee." [1] Furthermore, he has little opportunity ordinarily to practice preventive medicine. He is called only when the patient, of his own accord, decides that he is sick and requires medical attention. The physician seldom sees his patients unless they send for him. Except for vaccination against smallpox, which is required by law, and advice to persons exposed in cases of infectious diseases, his efforts are confined almost entirely to the cure of illness. Then, too, many physicians have a failing common to most professions, of depreciating the knowledge which the public at large has of their particular pursuit. "Medical men," says Dr. John M. Dodson, "are prone to underestimate the degree to which the public is already informed as to the developments in modern medicine and its possibilities in the prevention of disease." [2]

It is not surprising, therefore, that the rank and file of physicians should have failed thus far to wax enthusiastic over the development of preventive medicine, either in private practice or in public health work. Many physicians, for instance, feel that clinics and dispensaries take from the private practitioner business which rightfully belongs to them. In one Southern state it was found necessary to abolish the clinic as a public health institution because of the opposition of private physicians.

There have been exceptions, of course, to this general attitude. Especially are the leaders of the medical profession taking a more socially-minded viewpoint. This is a fortunate thing, for although in the future, as in the past, sanitary engineers, bacteriologists, nurses, educators, sociologists, and other technically trained persons will here and there lead the way, nevertheless if society is to proceed on a sound basis in the development of preventive medicine and public health work, it must look to physicians for a higher degree of direction than they have thus far assumed.

Such coöperation is imperative, not only for the best interests of the public health movement, but for the medical

[1] Burnham, A. C., *The Community Health Problem*, The Macmillan Company, New York, 1920, p. 26.

[2] Moore, *op. cit.*, p. 377.

profession as well. Should the profession fight this irresistible movement, it will be brushed aside or crushed, says one of its leaders, "as by a steam roller." [1] "We must join in on the great game of collective living and make ourselves felt on the constructive side," says another, Dr. R. L. Wilbur, in his presidential address in 1923 before the American Medical Association. "By our failure to lead in some instances we are already being forced into a position that may be interpreted as obstruction to progress. The danger is that organized medicine may become a defense organization. If it does, it will lose rampart after rampart before the great offensive provided by the development and spread of science. We must be altruistic in our public service as we have been in the relief of private need throughout the generations. . . ." [2]

Whether the necessary coöperation from medical men will be secured through a change in the methods of daily practice whereby the physician will receive a retaining fee to keep his clients well, or through the development of a system of state medicine, depends upon circumstances—and the medical profession.

THE PUBLIC HEALTH NURSE

"If there has been one single factor," says Dr. Burnham, "more than another which has made for general improvement in health conditions in the larger cities during the past quarter century, that factor is without doubt the rapid spread of public health nursing. Actual services during illness represents only a small part of the nurse's work. Education of the bedside attendants in proper methods of caring for the sick, education of the patients as to the necessity of early treatment, and education of the public as to the importance of cleanliness and sanitation are all considered a part of her duties. It is the general consensus of opinion that no program for the betterment of community health will be satis-

[1] Dodson, J. M., "Preventive Medicine and the General Practitioner," *Journal of the American Medical Association*, January 6, 1923, p. 4.
[2] Wilbur, *ibid.*, June 30, 1923, p. 1891.

factory unless the public health nurse plays a major part in its execution." [1]

The term "public health nurse" is understood usually to mean a graduate nurse who is devoting her efforts to social work which aims at the improvement of the health and welfare of the community. The last fifteen years have witnessed one form after another of social health activities added to her duties, so that now she plays an important role in virtually every form of life-saving and disease-prevention work. While it is impossible to outline definitely all the various forms of work in which a public health nurse may engage, they can be distinguished clearly from those of the institution nurse, working in hospitals, sanatoria, and other similar institutions, and from the private nurse, who gives continuous care to private patients.

So great is the reliance in modern health work upon the public nurse, so unique are her manifold opportunities for service, that it is of the highest importance that she be properly trained. The present shortage, due to the rapidly growing demand, has caused protest from some sources against what is called "overtraining." Among those, however, who may be expected to speak with authority, a short period of special training is considered not only desirable, but absolutely necessary. Indeed, the statement is made frequently that, in this field, a nurse without special training is worse than none, and there is a steady movement to increase the requirements in about the same proportion as her work is being extended.

"Specialists are required for certain problems, such as the venereal diseases, tuberculosis, infant and child welfare, school nursing; also mental hygiene, industrial nursing, medical social service, and dental hygiene. Each of these special fields requires special qualifications which can be had only through training and experience. In addition, all communities require public health nurses prepared for general service. A model plan of organization includes both the general nurse and specialists." [2]

[1] BURNHAM, *op. cit.*, p. 53.

[2] ROSENAU, *op. cit.*, p. 483.

The work of the public health nurse is primarily that of the health teacher, the messenger who carries into the home and interprets to the individuals there the gospel of good health. The most effective educational method is through personal service, and it is this which the nurse exemplifies. She must work largely alone and not under the immediate direction of a physician. She must know her bacteriology and her physiology, her sanitation and hygiene, well enough to teach their principles to others; and she, too, must deal with the individual, not merely as an individual, but as an element in a complex social group.[1]

A concrete illustration of the possibilities of public health nursing is the work done at the Henry Street Settlement in New York, under the direction of Miss Lillian Wald. Its story is told in a most interesting way in Miss Wald's book, *The House on Henry Street.*

THE MEDICAL SOCIAL SERVICE WORKER

Persons who come into contact with health agencies are more than mere bodies. They are social beings, and they present social as well as medical problems, the two being inextricably bound up with each other. Obvious as this fact must be, it was not recognized in this country, except incidentally in a few isolated cases, until the year 1905, when Dr. Richard C. Cabot began hospital social service at the out-patient department of the Massachusetts General Hospital by appointing a nurse with settlement experience to assist physicians in their cases by looking up home conditions and to do follow-up work on them.

In speaking of the circumstances which led to the initiation of this work, Dr. Cabot points out that it had been customary to sum up the cases dealt with under the heading of four questions: What is the physical state of the patient? What is the mental state? What is his physical environment? What is his mental and spiritual environment? It came to be seen gradually, he points out, that "the doctor is apt to know a great deal about the first of those four things, the

[1] Winslow, in *Science, op. cit.*, p. 31.

physical state, and a little about the second, the mental, but about the other two, almost nothing. The expert social worker comes with those four points in mind to every case. It is of interest to note that this fourfold knowledge is not the goal of the social worker merely; it is the goal of every intelligent human being who wants to understand another human being." [1]

Medical social service, therefore, was "conceived by a physician who, in seeking the improvement of dispensary practice, found in the social worker a potent means for more accurate diagnoses and more effective treatment." [2] Since 1905, nearly 400 social service departments have been introduced into hospitals and dispensaries in this country. Of course, the term is used rather indiscriminately to cover a variety of extra-mural activities and many kinds of personal service, but it is evident that the services of the social worker are utilized increasingly in all kinds of health work in order to deal effectively with the social conditions which affect physical welfare.

HEALTH LEGISLATION

The law is a stock means of social control, and it is inevitable that many of the common requisites for health should be translated into legal requirements. Laws pertaining to health comprise a very large and important chapter in the history of modern social legislation. In fact, it has become a rather general practice to propose social (particularly labor) legislation in a health guise, or to support it on the basis of hygienic arguments, in order to secure legislative and popular acceptance. It would be an interesting research project to establish, if possible, what proportion of the social legislation in any state in recent years has been, or pretended to be, motivated by the health interest.

There is considerable opposition to certain modern forms of health legislation on the ground that it is socialistic. Ac-

[1] Cabot, Richard C., in *Annual Report, National Conference of Charities and Corrections,* 1915, p. 220.

[2] Richmond, Mary, *Social Diagnosis,* The Russell Sage Foundation, New York, 1917, p. 35.

cepting for the moment the implied assumption that socialistic is synonymous with dangerous, unwise and unjustifiable, is such a charge warranted? Is the safeguarding of health for those whose chief asset it is any different, more unwise, less justifiable, than the protection of property for those who live wholly or in part upon property income? Does it involve the application of any new premise or policy of legislation?

"The large amount of health and safety legislation which fills modern statute books," says Freund, "represents less a change of legislative policy than a change of conditions that had to be met by an extension of state control. In principle the exercise of public power for the protection of life and limb is old-established, but prior to the nineteenth century there was relatively little occasion for its practical application. The nineteenth century brought two conditions which revolutionized the need for public control: the pressing of newly invented mechanical forces into the service of industry and the progress of science in discovering the causes of disease and their remedies. The imperative necessity of developing economic resources retarded adequate protection against mechanical dangers until it was possible to combine safety with the effective carrying on of industry; the former had to yield to the latter. This is well illustrated by the history of mining legislation. Sanitary legislation encountered resistance on the part of personal and property rights as well as of business interests by reason of the widespread skepticism regarding the reality of the alleged dangers or the efficacy of the proposed remedies, but the English law of 1848 and the New York law of 1857 firmly established the principle of an elastic administrative control, and the recent American so-called eugenics legislation indicates the long distance that we have traveled in the direction of state interference with private affairs. Living under free institutions, we submit to public regulation and control in ways that would appear inconceivable to the spirit of Oriental despotism; it is well known what deep-seated repugnance and resistance of the native population to the invasion of their domestic privacy and personal habits English

health officers in India have to overcome in order to enforce the sanitary measures necessary to prevent the spread of infectious and contagious disease. Oriental systems of policy act more powerfully upon the habits of individual life than modern governments do; the primal need of the community for the perpetuation of its own existence through marriage and offspring is more effectively secured in India and China than in western Europe; but the sanction is custom and not law; and in the same way the sanitary régime of the Old Testament seems to have been enforced by spiritual threats and not by secular penalties. Modern policy makes legislative compulsion coextensive with the reciprocal dependence of men upon another's standards of conduct for the preservation of the health and safety of all, and with the progress of invention and of science there seems to be hardly any limit to that independence. Our modern sanitary laws are laws in the real sense of the term, enforced by the power of the state. As such, they represent, if not a new policy, yet a new legislative activity and function." [1]

One form of impending health legislation in the United States calls for further comment. "The adaptability of the insurance method in the solution of modern economic problems is unmistakably shown in the spread of 'social insurance' in countries whose governments embody widely different political ideals. As soon as certain economic risks have been recognized as menacing the wage worker and his family, the insurance method of meeting the risks has been used. These economic risks may be generally classified as those causing the death of the bread-winner in a family, the physical inability of the bread-winner to perform labor, and his inability to find employment. For a large proportion of the wage-earners in any country these risks are too great to be provided for by individual effort and too little appreciated to be provided for even if the individual were able to do so. Hence social provision through the distribution of loss has been

[1] Freund, Ernst, "Standards of American Legislation," quoted and adapted by Ford, James, *Social Problems and Social Policy*, Ginn & Co., Boston, 1923, pp. 263-264.

found to be necessary. This kind of social provision has come to be known as 'social insurance.' " [1]

Health insurance is probably the most prevalent form of social insurance. Most European countries have encouraged and provided for it in some form: voluntary health insurance systems have been subsidized by the governments of France, Belgium, Denmark, Sweden, and Switzerland; while compulsory systems have been established by Great Britain, Germany, Austria, Hungary, etc.

In this country, we are in the first stage of the development of some form of health insurance. Its basic idea, of distributing the cost of sickness over a group of persons, has the sanction of long use in many private and commercial organizations. Contribution of employer is accepted in principle, as is the coöperation of employer and employee. In the last decade, a number of states have authorized investigating commissions to study and report on the project. These commissions have been almost unanimous in their conclusions that some form of health insurance is necessary to prevent the present waste of time, money, and suffering. Further developments are a matter of time.

POPULAR HEALTH EDUCATION

"For purpose," said Dr. Haven Emerson at the dedication on November 1, 1924, of the First Health Unit in Boston, "we have the translation of the quickly following facts of science into language, habit, and use of households, interpretation by the busy messengers of health, of theory and practice of life in terms of kitchen, playground, and nursery. From this welcoming, receiving station . . . it will be the purpose of the doctor, nurse, and all variety of friendly visitors to distribute as rapidly as possible the good news of living as in the past the hurrying ambulance has raced with death through the streets. It will be the purpose of the health officer, the district agent of city service, to use this as a transforming station, to short circuit the knowledge of mankind for the better illumination of his local community. . . . The methods

[1] Warren and Sydenstricker, *Health Insurance*, p. 49.

will be those of education, not enforcement, persuasion, not authority, example, not threats."

In these words are stated succinctly the second fundamental task of modern health work. The organization of medical service for the detection and early treatment of incipient disease and hygienic instruction are "the twin motives of the modern public health campaign. They dominate every one of the major health programs of the present day."

The following terminology, suggested by the United States Public Health Service, serves to prevent confusion between the several more or less definite educational projects which must be worked out in the rather immediate future:

> Health training or health instruction—the teaching of health habits to children in school and the imparting of health information.
>
> Public health education (a term comparable to "medical education")—the teaching of men and women to become health officers, nurses, and other kinds of sanitarians.
>
> Health education—teaching present and prospective school-teachers how to teach health habits and how to give health information.
>
> Publicity work—"selling public health to the people," so that they will give moral and financial support to public health agencies and public health work.
>
> Popular health education—giving to the general, non-school-attending public, information regarding disease and hygiene, and influencing their behavior so that they will avoid disease and not expose other persons to infections.[1]

It is the latter with which we shall concern ourselves primarily here.

Education in personal hygiene calls for new methods and new machinery. What is required is no narrow and restricted pedagogy, but, in the first place, a general propaganda applicable to all alike. There are certain fundamental principles as to food, fresh air, exercise, rest, and dangers of infection which everyone should know. An elaborate technique of health bulletins, health news service, health lecture bureaus and institutes, health exhibits, radiograms, etc., has been created to meet this need. In addition to their educational value, these methods serve a useful purpose in securing popular support for the community health program in its larger aspects.[2]

[1] Mimeograph statement, *U. S. Public Health Service*, April, 1922.

[2] Winslow, *Evolution and Significance*, etc., pp. 58-59.

Mass methods of this kind form, however, but one step toward the goal which is in view. Personal hygiene is, after all, an individual matter. The kingdom of health, like the Kingdom of God, is within us. "Each living machine is in some respects different from every other living machine, and in many cases deviations from the normal are so marked that they demand fundamental modifications in the regimen of daily life. The man with the weak heart needs less exercise, the man with weak lungs more air and more rest, the man with diabetes a special kind of food. In addition to the hygiene for the normal, which we may teach to all, there is a hygiene for the abnormal which requires an adaptation to each specific case." [1]

To teach all individuals the principles of hygiene, to teach each according to his or her own needs, and to do so effectively —this, so easy to say and so difficult to do, is the task to which health work has set itself.

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[1] Winslow, *Science, op. cit.*, p. 27.

CHAPTER XIX

ACCIDENTS AND THEIR COMPENSATION

Of the 1,101,863 deaths reported in 1922 in the registration area of the United States, 65,263, or almost 6 per cent, are listed as accidental. The registration area in that year included 85.3 per cent of the estimated population of the United States. Assuming that the rate in the registration area prevailed throughout the entire country, a total of 76,500 accidental deaths occurred in that year. It is obvious, then, that the factor of accident is an important one in the loss of life, limb, and physical well-being.

AUTOMOBILE ACCIDENTS

The increase in the number of automobile accidents and fatalities resulting from such accidents in the last fifteen years is "a phenomenon which stands alone in the whole field of American vital statistics." [1] In 1906, there were 183 deaths due to automobile accidents in the registration area; by 1922, the number had risen to 11,666. For 1924, the National Safety Council placed the number for the entire United States at 20,000, which is equivalent to one death for every twenty-six minutes. This number comes dangerously near to the estimated total for deaths due to industrial accidents, as will appear presently.

From the reports of insurance companies and the Division of Vital Statistics, the number of automobile fatalities varies at the present time at between 14 and 16 per 100,000 population. In 1923, for example, it was 15.4 per 100,000 policyholders in the Metropolitan Life Insurance Company. (This company's rate for 1911 was 2.3 per 100,000). Such a rate

[1] Dublin, Louis I., "How Can Automobile Accidents Be Controlled?" address delivered before the Health and Accident Underwriters Conference, March 5, 1924. Published by the Metropolitan Life Insurance Company, New York, 1924, p. 2.

is higher than that for suicides, more than twice as high as that for typhoid fever, and rapidly approaching that for diabetes. The American rate is considerably higher than that for the countries of Europe. There are killed annually by automobile accidents in New York City twice as many people per 100,000 population as in London, and the rate for New York in 1922, for instance, was less than half that in Los Angeles. There is a marked variation in rates among American cities, as the following table will serve to show:

AUTOMOBILE DEATH RATES FOR 1922 IN 49 AMERICAN CITIES OF 100,000 POPULATION AND OVER.[1]

City	Death Rate per 100,000	City	Death Rate per 100,000
1. Los Angeles	32.5	26. Toledo	16.1
2. Camden, N. J.	24.6	27. Baltimore	16.0
3. Memphis	24.4	28. Boston	15.8
4. Trenton	22.4	29. Pittsburgh	15.6
5. Chicago	22.1	30. Oakland	15.4
6. San Francisco	21.7	31. Columbus	15.4
7. Denver	21.7	32. Dallas	15.1
8. Hartford	21.0	33. New York	14.9
9. Providence	20.8	34. New Bedford	14.9
10. Erie, Pa.	20.1	35. Washington, D. C.	14.4
11. Buffalo	20.1	36. Omaha	13.4
12. New Haven	20.0	37. St. Paul	13.3
13. Cincinnati	19.3	38. Houston	13.3
14. Bridgeport	18.8	39. Albany	12.9
15. Salt Lake City	18.6	40. Milwaukee	12.8
16. Kansas City, Mo.	18.3	41. Philadelphia	12.6
17. Newark, N. J.	18.1	42. Reading	11.8
18. Dayton	17.9	43. Elizabeth, N. J.	11.8
19. Minneapolis	17.7	44. Springfield, Mass.	10.0
20. Cleveland	17.3	45. Tacoma	10.0
21. St. Louis	17.1	46. Fall River	9.9
22. Nashville	17.1	47. Portland, Ore.	9.7
23. Detroit	16.9	48. Spokane	8.6
24. Birmingham	16.2	49. Jersey City	8.2
25. Indianapolis	16.2		

It will be suggested at once that this is not a fair basis upon which to compare cities, because cities differ in the number of machines in operation, but Dublin contends that it "is entirely wrong in principle to excuse or minimize the appalling conditions that prevail in certain communities, simply on the ground that they have relatively more machines in operation.

[1] DUBLIN, *op. cit.*, p. 4.

The very existence of this condition calls necessarily for a greater effort to cope with the situation. If logically carried out, there could be no limit to which the death rate from automobile accidents could mount as the number of machines increased." [1]

The following table shows the number of automobile fatalities per 1,000 automobiles registered. It will be observed again that there is a considerable variation, that certain large communities like Chicago and New York have six and seven times as high a rate as certain others:

DEATHS PER 1,000 AUTOMOBILES REGISTERED IN CERTAIN AMERICAN CITIES [2]

City	Death Rate per 1,000 Automobiles	City	Death Rate per 1,000 Automobiles
1. Chicago	2.98	20. Bridgeport	1.19
2. New York	2.90	21. Springfield, Mass.	1.14
3. New Haven	2.50	22. Los Angeles	1.05
4. Boston	2.33	23. Columbus	1.03
5. New Bedford, Mass.	1.99	24. Minneapolis	1.01
6. Hartford	1.97	25. Kansas City	1.01
7. Birmingham	1.92	26. Detroit	.99
8. Providence	1.74	27. Omaha	.96
9. Cincinnati	1.70	28. Indianapolis	.95
10. Newark, N. J.	1.54	29. Toledo	.93
11. Milwaukee	1.54	30. Albany	.92
12. San Francisco	1.52	31. Dayton	.91
13. Memphis	1.50	32. Reading	.76
14. Cleveland	1.50	33. Dallas	.67
15. Nashville	1.48	34. Houston	.61
16. St. Louis	1.48	35. Portland	.60
17. Oakland	1.29	36. Salt Lake City	.47
18. Denver	1.26	37. Spokane	.41
19. Washington, D. C.	1.20		

How many persons are injured annually in automobile accidents is not known. In New York City, thirty-two are injured for each one killed. This ratio, applied to the entire country, would mean that there were 640,000 injuries in 1924. This is probably too high, and it is more likely that Dublin's estimate [3] of "425,000 more or less disabling injuries" is nearer to the mark.

These figures represent an onslaught that has fallen upon

[1] DUBLIN, *op. cit.*, p. 4.
[2] *Ibid.*, p. 5.
[3] *Ibid.*, p. 2.

us almost overnight. "There is something not only distressing in all this, but unspeakably pitiable. I say this because about one-third of the injuries and fatalities affect children. In the cities, this proportion is often a half. It is now absolutely unsafe for children to play in the streets of our cities. It is not enough that they are mained by the thousands and tens of thousands each year, but a psychology of fear is developing among them. Every city parent knows this to be true and is continually concerned about it. The play of children is seriously restricted and their life in the open, in the cities at least, is a thing of the past. I hate to think what twenty-five years of this atmosphere of fear will mean to the men and women of the next generation."[1] And meanwhile, most of us have taken the situation with an air of fatalism as though there were no remedy.

INDUSTRIAL ACCIDENTS

The annual death toll of industry is less startling only because time has made us more callous toward it. The terror of automobile accidents goes back less than two decades, that of industry to the Industrial Revolution.

(1) *The Extent of Industrial Injuries*

The number of industrial accidents occurring annually in the United States is not known. "There are no statistics of work injuries, or even of work accidents for the whole United States. Six states have no compensation laws and no records of industrial injuries; many even of the compensation states make no attempt to compile or publish statistics. About twenty compensation boards issue annual or biennial reports which contain the number of injuries compensated in their respective jurisdictions. But of these reports some are for calendar, others for fiscal, years; some include and others exclude occupational disease, some exclude establishments which employ fewer than four, six, or ten persons; some purport to give all reportable injuries, others omit disabilities of less than one week, ten days, or two weeks. The classification of injuries

[1] DUBLIN, *op. cit.*, p. 2.

in respect to severity is equally diverse. Any attempt at combination or comparison of the published statistics is well-nigh hopeless." [1] The most reliable data are for the iron and steel industry, mining, and the railways. This is due to the fact that three federal agencies, namely, the Bureau of Labor Statistics, the Bureau of Mines, and the Interstate Commerce Commission, have undertaken the task of collecting the facts and putting them into form for use.

In the absence of accurate data, recourse must be taken to the general estimates. Most of these in recent years have shown substantial agreement. A few of these will be summarized briefly.

Mr. Frederick L. Hoffman conservatively estimated the probable number of fatal industrial accidents among American wage-earners, including both sexes, for the year 1913, at 25,000, and the number of injuries involving a disability of more than four weeks at 700,000.[2]

Dr. Harry E. Mock placed the number of fatal accidents (1917) at 28,000; the number of non-fatal, causing disability of over four weeks, at 875,000; and the number of dismemberments at 74,600.[3]

Sidney J. Williams, of the National Safety Council, estimates that in 1919 there occurred in industry about 23,000 fatal accidents, about 575,000 non-fatal accidents causing five weeks or more disability, and about 3,000,000 accidents in all causing at least one day's disability.[4]

From an examination of all the data and estimates available (1923), E. H. Downey concludes that "industrial injuries in the United States annually cause at least 25,000 deaths, a like number of serious permanent disabilities, and some 2,000,000 temporary disabilities of more than three days' duration." [5]

[1] Downey, E. H., *Workmen's Compensation*, The Macmillan Company, New York, 1924, p. 16.

[2] Hoffman, F. H., *Industrial Accident Statistics*, Government Printing Office, Washington, 1915, p. 6.

[3] *Vocational Rehabilitation of Persons Disabled In Industry*, Government Printing Office, Washington, 1919, p. 26.

[4] Williams, S. J., Communication to the Federated American Engineering Societies, May, 1921.

[5] Downey, *op. cit.*, p. 1.

A comparison will suggest what these figures involve. "Of deaths alone the twelve months' total is four times the number killed and mortally wounded in the battle of Gettysburg; of permanent injuries the annual sum surpasses the yearly average of the Civil War. The total casualties of the American Expeditionary Force in the World War did not equal the casualties to American workmen in peaceful employments between April, 1917, and the signing of the armistice. The toll of life and limb exacted by American industries during the second decade of the twentieth century exceeds the nation's losses in battle from the Declaration of Independence to the present day." [1]

Such comparisons, however, are unfair—to war. For wars cease in time, but the toll of industry is constant. It is the cumulative aspect of the problem of industrial accidents that staggers the imagination. Let the reader select the most conservative of the estimates cited above and multiply by ten or fifteen to get the more recent blood cost of industry. In the ten years up to January 1, 1922, the steam railroads of the country killed, according to statistics that are incomplete 27,534 employees, and injured 1,527,529. During the same time, 23,987 employees were killed in coal mines. More than 50,000 lives, in two industries, in ten years—such are the calm pursuits of peace.

(2) *The Social Cost of Industrial Accidents*

Various efforts have been made to approximate the money cost of specific losses resulting from industrial accidents.

For the single year 1916 it was estimated that accidents caused a time loss of 105,000,000 days, or 360,000 years of 300 working days each, and a loss of $210,000,000 in wages.[2]

Williams's estimate for 1919 is placed at 292,000,000 days, figured at an average wage of $28 per week. Subtracting the subsistence of those killed, this means an economic loss to the country of about $837,000,000 for the year.[3] He continues

[1] Downey, *op. cit.*, p. 1.

[2] "Training Courses in Safety and Hygiene," *United States Federal Board for Vocational Education*, Washington, 1919.

[3] Williams, *op. cit.*

by taking the figures of the state of Wisconsin as roughly typical, and estimates the total direct cost of industrial accidents in the United States in 1919, including medical aid and insurance overhead, at $995,000,000. He emphasizes the fact, however, that this figure falls short of the mark because it does not include such items as medical expenses incurred by workmen and not paid by the employer or insurance company, the cost of training new men to take the place of those injured, expenses incurred in keeping track of injured workmen and their families, etc. He concludes, therefore, that the addition of such items would bring the total well over a billion dollars a year.[1]

Downey agrees with Williams in placing the direct loss to the nation at $1,000,000,000 annually. "Temporary disabilities," he points out, "alone cause a yearly loss of more than 6,000,000 working weeks. But the social cost of minor injuries is small in comparison with the cost of deaths and permanent disabilities. . . . A fatality, upon the average, cuts off twenty years of productive labor and a permanent injury causes a continuing economic loss proportionate to the age of the worker and the degree of incapacity. Upon the average, accordingly, each death or permanent total disability is equivalent to 250 temporary disabilities of four weeks' duration. Reckoned in the same manner, the loss of a hand is equal to 500 weeks of total disability, and the blindness of one eye entails an ultimate loss of six years' labor. . . . Taking all industries together, the accident loss amounts to canceling one week's production in every year; for bituminous coal miners it comes to one-tenth, and for structural iron workers to one-fifth of normal full time. All this takes no account of industrial diseases, of which there are only meager and fragmentary records, nor does the estimate of $1,000,000,000 annual loss of potential earnings include the cost of medical and hospital care for the injured." [2]

Such losses of productivity and wages, staggering as they are, constitute but a part of the story of social costs, most of

[1] WILLIAMS, *op. cit.*
[2] DOWNEY, *op. cit.*, pp. 1-2.

which it is impossible to translate into monetary units. For the missing limb, for the pain of wounds, for the broken spirit, for widowhood and orphanage with the long trail of their consequences, there can be no talk of reparation.

In any more complete analysis of the social costs involved, two groups of facts must be borne in mind. One of these is that industrial accidents fall chiefly to the lot of wage-earning families, who seldom have property income or an adequate margin of savings, but who are dependent directly and wholly upon the daily earnings of the wage-earning member or members. Of 75,000 wage-workers, for example, who suffered compensable injuries in Pennsylvania during 1919, only 24 per cent were earning as much as $30 per week at the time of injury, whereas 30 per cent fell short of $1,000 per annum.[1]

The significance of this is intensified by the further fact that the victims of work accidents are chiefly men in the prime of life, since the young and vigorous engage predominantly in the extra-hazardous employments. Campbell's earlier analysis showed that about 45 per cent of the casualties considered befell men under thirty years of age; about 80 per cent, men under forty; and about 90 per cent, men who had not reached fifty.[2] Fisher emphasizes the same fact. He says: "There does exist an age tendency to accident. Very young and very old workers are injured more frequently than middle-aged ones. Men from twenty to twenty-nine years get hurt more frequently than men from thirty to thirty-nine years."[3] Similar is the evidence from Pennsylvania, which shows that of 8,550 persons fatally or permanently injured in Pennsylvania compensation insurance experience, 1916-19, 10 per cent were under twenty-one, 50 per cent were between twenty-one and forty, 20 per cent were between forty and fifty, and only 6.5 per cent were over sixty.[4]

In other words, the death or injury comes to those to whom

[1] Downey, *op. cit.*, p. 12.

[2] Campbell, G. L., *Industrial Accidents and Their Compensation,* Houghton Mifflin Company, Boston and New York, 1911, p. 21.

[3] Fisher, Boyd, *Mental Causes of Accidents,* Houghton Mifflin Company, Boston and New York, 1922, p. 9.

[4] *Statistical Analysis of Workmen's Compensation Insurance in Pennsylvania,* 1916-1920.

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it spells cessation of family income, and at a time when children are small and the responsibilities of parents are great. Family hopes are thus blasted at the very time when they are apt to be most high.

The situation regarding the children is evidenced clearly in a summary of fatal accidents in Pennsylvania coal mines during the seven-year period from 1916 to 1922. The average age of the 4,065 children rendered fatherless was six years and thirty-four weeks. Of the total number of children, 199 were posthumous, their average birth date being seventeen weeks after the father's death.[1]

"The immediate result, in the absence of systematic accident relief, is poverty and the long train of evils that flow from poverty. When a skilled craftsman is killed or injured in the course of duty, the children are taken out of school, the family removes to less comfortable quarters in a more undesirable neighborhood, the mother takes in boarders or goes out to work, the boys sink to the rank of the unskilled, and the girls marry beneath the economic class in which they were born. When a similar calamity befalls a common laborer, the widow and the older children eke out such scanty earnings as they can at casual labor or in the sweated trades; if the family are too numerous or the children young, the hopeless struggle too often ends in pauperism." [2]

Behavior problems of all sorts are apt to follow, too, upon the disorganization of the family which follows such misfortune. The unusually large number of delinquencies which occur among the children of incomplete homes is one of the most obvious facts in the whole field of social pathology. Teachers in the schools, officials of the courts, attendants in reformatories and reform schools, can, as they do frequently, bear eloquent witness to this relationship. The story of industrial accidents is at best a tale of destitution, of blighted hopes and of arrested development.

Another psychological problem created is that of those who are disabled permanently. Permanent physical disability may

[1] Summarized in the *American Labor Legislation Review*. June, 1924. p. 125.
[2] Downey, *op. cit.*, pp. 13-14.

scar the soul quite as much as it mars the body. "How often have we seen physical disability result in misanthropy. It is said that Lord Byron's sensitive nature became soured largely because of his crippled condition. Pope's disability without doubt contributed not a little to his unhappiness. Shakespeare attributes Richard III's malevolence to his resentment of society's attitude toward him on account of his deformity. Schiller's Franz Moor rebels at the trick nature played him in his physical make-up. Moreover, most men wish not only to be looked upon as physically well formed, but to be independent of others for their support. If they possess the souls of men, they rebel at being objects of pity." [1]

While the immediate and direct costs of work accidents fall with crushing weight upon the individual and the family, the burden is transferred sooner or later to the community at large. In the last analysis, it is society which pays the bill—of loss in productive power, of families broken up, of widows in need, of children orphaned, of lives broken, and of spirits crushed. The translation of individual or family losses into communal liabilities may take ofttimes a long and circuitous route, and the relation of the ultimate and by-products to the original factor be unsuspected; nevertheless, the fact of such translation is inevitable.

THE AMERICAN COMPENSATION SYSTEM

"In these facts lie the need and the justification of the compensation system. Since disabling injuries by accident and disease are inevitable concomitants of that mechanical industry which has made modern civilization possible, and the products of which are enjoyed in fullest measure by the classes least exposed to its hazards; since the victims of these injuries are precisely those least able to bear the burden of economic loss themselves or to shift it to others; since the resultant evils of poverty affect not alone the families immediately concerned but the state as well; and since the whole pecuniary cost of work injuries can be so distributed as to be little felt by anyone—public opinion has almost everywhere

[1] GILLIN, *Poverty and Dependency, op. cit.*, p. 426.

come to hold that those who are crippled in the production of the community's wealth, and the dependents of those who are killed, have a right to indemnity from the public for whom they wrought. This principle has been indorsed both by organized labor and by organized capital. . . . It forms the basis of legislation in twenty-six foreign countries and in forty-two of the United States, and has been recommended for adoption by every investigating commission that has thus far reported in this country or abroad. So generally, indeed, has the principle of workmen's compensation been accepted by students of political science, by jurists, statesmen, and the public, that 'to assert to the contrary is to turn the face against the enlightened opinion of mankind.'" [1]

(1) *Compensation Legislation Abroad*

It was in 1884 that the first obligatory insurance law based on the principle of workmen's compensation was passed to Germany. Under this Act, which was a part of Bismarck's social-insurance project to check the growth of socialism, workmen were entitled to indemnity, whatever the cause of the accident. Since then the progress in the acceptance of this theory throughout the civilized world has been remarkable both for its rapidity and for its completeness.

Germany's example was followed first by Austria in 1887. From Austria it spread to Norway, where, in 1894, an Act was passed requiring employers to insure their employees in a state insurance department. The next countries to take up the subject, Great Britain in 1897 and Denmark in 1898, introduced workmen's compensation without making insurance compulsory. Other nations were quick to adopt this policy. France and Italy in 1898, Spain and South Australia in 1900, Sweden and the United Netherlands in 1901, Russia and Belgium in 1903, Hungary in 1907, and Switzerland in 1911, passed compensation laws in which some one of the several forms of compensation which had come into existence were featured. Meanwhile the British dominions had fallen into line, so that by the end of the first decade of the twentieth

[1] Downey, *op. cit.*, pp. 14-15.

century the principle of workmen's compensation had been adopted throughout our industrial civilization—with the exception of the United States and Turkey. In other words, the United States was the last of the great industrial nations to recognize a social interest in work injuries. Virtually all of Europe had accepted the principle of industrial responsibility for industrial injuries long before that principle was seriously debated in American legislatures.

(2) *Common Law Principles of Compensation*

So late as 1910, the common law of employers' liability still governed the right of workmen and their dependents to compensation for injuries arising out of their employment. It seems pertinent, therefore, to review the essential principles of the common law in this respect, since there are states and occupations in which they still obtain.

The essential feature of the common law was liability for injuries attributable to the fault or negligence of an employer. The liability of a person, firm, or corporation for damages arising out of a personal injury befalling an individual because of the omission of a duty or the commission of a careless act, is of long standing in the English common law. Linked to it is the principle of *respondeat superior,* which was first laid down in 1697 in the case of Tuberville *vs.* Stampe, in which the court declared that he who chooses the convenience of delegating to others the performance of his personal and business service is as responsible for injuries brought about in doing them as if he were himself the direct agent. In fine, the master must answer for the negligence of the servant. Shortly after this, however, the courts added the principle of contributory negligence. The substance of this modification was that if the plaintiff had so contributed to the causes of the accident that the breach of duty on the part of the defendant was not its proximate cause, then he, the plaintiff, had no ground for action.[1]

Other modifications followed in the course of time. One of these was the enunciation of the doctrine of assumed risks.

[1] CAMPBELL, *op. cit.*, p. 52.

This doctrine was to the effect that he who knowingly places himself in danger of personal injury by accepting hazardous employment, assumes, therewith, the risk of injury. No one, declared the learned courts, is in a better position to know the dangerous character of his work than the workman himself. He can demand wages therefor commensurate with the risk involved. If, for any reason, the danger in his particular position is greater than might be expected ordinarily, his legal duty is to give up his employment or to obtain a promise from the employer to make right the abnormal situation. A free citizen, declares this legal theory, may work under danger or not, just as he chooses. If he chooses to do so, then he has assumed the risk of injury.

The most remarkable of these modifications was the fellow-servant doctrine, which appeared in 1837 as an amplification of the doctrine of assumed risks. This theory asserted that danger of injury through the negligence of another servant of the same master is a known, common, and ever-present risk of working in company with others, and that, consequently—in accordance with the doctrine of assumed risk,—a worker so injured has no ground for action against his employer. In Farwell *vs.* the Boston and Worcester Railroad Company, the court declared (1842): "These are perils which the servant is as likely to know, and against which he can as effectually guard, as the master. They are perils incident to the service, and which can be as distinctly foreseen and provided for in the rate of compensation as any others." [1]

It is difficult to imagine a more tragic perversion of justice than the functioning of such academic theories in the practical world of industry. "By this concatenation of judge-made doctrines—no liability without fault, assumption of risk, contributory negligence, and the fellow-servant rule—some seven-eighths of all work injuries were left without legal relief. In highly organized industries, indeed, such as railway transportation or steel manufacturing, great employing corporations were able to escape all liability by the simple device of delegating every duty to employees. Even in the rare cases where

[1] CAMPBELL, *op. cit.*, pp. 54-55.

liability existed recovery could be had only by a suit at law. The suits were necessarily prosecuted on a contingent-fee basis and quite half of the amounts ultimately awarded were handed over to attorneys. Litigation was long drawn out, appeals, reversals, and retrials were numerous, and several years ordinarily elapsed between the date of injury and the final award. The result rarely turned upon the merits of the case and the amount of the verdict was wholly a matter of caprice. The difficult and doubtful venture into the courts was worth while only for fatal or serious permanent injuries; for temporary disabilities the legal remedy was altogether ineffective." [1]

It is but fair to add that many statutes were enacted prior to 1910 which mitigated the hardships of the common law in certain respects in particular occupations, but such mitigation was confined to these specific employments and left untouched the chief defects of the common law. After all, liability depended on proof of positive negligence, and could be secured only by court action. Surveying the first ten years of the present century, it may be said safely that during those years of rapid industrialization wage-earners bore at least nine-tenths of the direct economic cost of work injuries, and that of the sums paid out by employers in the form of damages and liability insurance premiums, less than one-fourth reached the victims of these injuries.

(3) *Development of Compensation Legislation in the United States*

"The injustice and inexpediency of this situation gradually forced itself upon the public consciousness. Organized labor, after wasting its energies for many years upon employers' liability laws, turned at last to workmen's compensation. A series of notable studies by the United States Bureau of Labor during Roosevelt's administration drew attention to the successful experience of European countries in workingmen's insurance and to the lamentable failure of our own country to meet the problem of work injuries. Publicists, reformers, and

[1] DOWNEY, *op. cit.*, p. 144.

muck-rakers took up the work of popular education; the American Association for Labor Legislation, the Pittsburgh Survey and *Charities and the Commons* made the facts and arguments familiar to all who read. Lawyers, judges, and teachers of law exposed the fallacies of the rules which it was their business to expound and spoke courageously for a legal principle which would better serve the ends of social justice. . . .

"The awakening of public conscience to the social problem of work injuries led, near the end of the first decade of the present century, to the appointment of many official commissions and legislative committees to investigate the subject of employers' liability and workmen's compensation. These commissions held public hearings, took volumes of testimony, gathered much original material on the working of employers' liability, and recommended legislation designed to sweep away the common-law system. In consequence of all this agitation, sixteen compensation laws were enacted before the close of the legislative year 1912. The less progressive states rapidly fell into line until at the end of 1921 only six commonwealths and the District of Columbia retained the outworn system of employers' liability. Seldom has a legislative movement of equal social significance spread more rapidly over the land." [1]

There are, at the present writing (1927), but five states, all in the southern portion of the Union, that are without compensation laws. These states are North Carolina, South Carolina, Florida, Mississippi, and Arkansas. Unfortunate as these omissions are, the American compensation system is, speaking territorially and as regards population, rather complete.

(4) *Provisions of Workmen's Compensation Acts* [2]

No two compensation acts in the United States are alike, and taken as a whole, they are distinguished more for their dissimilarities than for their likenesses. However, a number

[1] Downey, *op. cit.*, pp. 145-146.

[2] Condensed from *Bulletins of U. S. Department of Labor*, Government Printing Office, Washington, No. 240, No. 275, No. 379, and No. 423.

of provisions have been adopted rather uniformly, and it is possible to make some generalizations regarding the provisions of these acts.

Systems Provided For.—American compensation laws may be classified as compulsory, elective, or voluntary, dependent upon the degree of restraint to which employers are subjected to accept the compensation provisions. A compulsory law requires every employer within its scope to accept the Act and to pay the specified compensations. An elective law is one in which he has the option to accept or to reject, but, in case he rejects, the customary common-law defenses are abrogated. Voluntary systems differ from the elective in that if the employer does not voluntarily come under the provisions of the Act, the common-law defenses remain unabrogated. Thirty-one states have the elective, twelve the compulsory, form. On the whole, very few employers have rejected the Acts.

Burden of Cost.—With but one exception the burden of cost for compensation is entirely upon the employer. Under substitute insurance or benefit schemes, the employees may be required to contribute to the fund, but, since the laws do not allow the employer to reduce his liability, the compensation benefits received by injured employees must equal the compensation scale as provided in the Act plus the employees' contributions, and consequently there is no real tax upon the employee for the statutory benefits.

Injuries Covered.—Compensation laws are limited to injuries covered, just as they are to employments covered and persons compensated. No state holds the employer liable for every injury received by the employee. In general, the injury must have been received in the course of employment and as a natural consequence therefrom. In other words, the injury must result from a hazard of the employment, not merely one of the hazards of existence. Commissions and courts have been liberal in their interpretation of this matter. Granted a causal connection between injury and employment, compensation is usually allowed.

Exemptions Due to Employee's Fault.—Most states do not grant compensation for injuries resulting from some gross

fault of the employee. Four states, however, have not accepted this principle and allow compensation regardless of the employee's negligence. Thirty-five states withhold compensation if the injury is caused by the willful intention of the employee to injure himself or another; 30 deny compensation if injury is due to intoxication; 16 if caused by willful misconduct; and 12 if the employee is guilty of violation of safety laws or removal of safety appliances.

The Waiting Period.—Most states require a minimum duration of disability as a condition to the payment of compensation benefits. This does not apply to medical and hospital relief, which is to be provided at once. Two states require no waiting time; 5 states, 3 days; 1 state, 5 days; 31 states, 1 week; 4 states, 10 days; and 4 states, 2 weeks.

The Compensation Scale.—In all but two states the amount of compensation is based upon wages. A few states, however, provide fixed lump sums or pensions for certain injuries, but apply the percentage system to all others. In most of the states the prescribed percentage remains uniform for all injuries. A few states have varying percentages for different types of injuries, and in several the percentage varies with conjugal conditions and the number of children. This variation is on the increase.

Using as a basis the rates for temporary total disability, it appears that 50 per cent of the employee's wages is allowed in compensation in 16 states, 55 per cent in 3 states, 60 per cent in 8 states, 65 per cent in 5 states, and 66 2/3 in 12 states and under the federal statute.

Weekly Maximum and Minimum.—The weekly benefits are subject, as a rule, to a maximum and a minimum limit. The former may prevent the higher-paid employee from securing the full proportion of his earnings that the percentage provision would indicate, while the minimum named is often affected by a qualification that if the wages received are less than such a minimum, the amount of the actual wages shall be paid as a benefit.

No maximum or minimum provision is fixed in Arizona and Alaska. Under the provisions for temporary total disabilities,

5 states have a maximum of $12, 2 states of over $12 and under $15, 12 of $15, 5 of $16, 1 of $17, 3 of $18, while 12 permit amounts of over $18 per week. Monthly maximums are prescribed in three states and by the federal law, ranging between $60 and $90 per month.

Death Benefits.—The methods provided for determining compensation for death vary considerably. In most cases they approximate five to seven years' earnings of the deceased employee. Death benefits continue in 8 states and under the federal law for life or until remarriage. The majority of states apply a wage percentage for specified periods.

In 6 states there is the requirement that the total shall not exceed three or four years' earnings, 13 states pay for 300 weeks, 7 for 312 to 360 weeks, and 6 from 400 to 500 weeks.

Permanent Total Disability.—There is apparently quite a tendency to recognize the greater economic loss in case of a permanent total disability than in case of death. Eighteen states and the federal government pay life benefits for permanent total disability. The significance of this latter provision is qualified in a few states by limitations on the total amounts payable, as $3,000 in South Dakota, $4,000 in Arizona, and $5,000 in Maryland. The $10,000 limit fixed in Minnesota has the merit of comparative liberality, but its provisions would be exhausted in 500 weeks at the maximum allowed rate of $20 per week. Other states, without life payment, grant compensation for from 5 to 18 years, in some cases limited, however, by fixed total amounts.

Partial Disabilities.—Permanent partial disabilities are dealt with in two ways—one by paying a percentage of the wage loss, the other by payments for fixed periods for specified injuries. The latter is more common, all but two states having schedules of greater or less fullness. In all but three of these the payments are weekly amounts based on wages. In the others the payments are fixed sums.

Medical Benefits.—All compensation Acts now provide medical benefits. These provisions have shown a tendency in the revision of laws to become more liberal. In 8 states,

neither time nor amount is limited; in 9 states both are limited; in the others either time or amount is limited.

(5) *The Rehabilitation of Injured Workmen*

One of the great benefits derived from our recent war experience has been the development of a system for the re-education and rehabilitation of war cripples. This in turn suggested the importance of constructive treatment for disabled civilians. As a result, a number of states and finally the federal government undertook the rehabilitation of those disabled in civilian life, more particularly those in industry. Massachusetts was the first state to pass (1918) an industrial rehabilitation Act, and by June, 1920, when the federal Act was passed, eleven other states had placed such laws on their statute books.

The federal Act of 1920 provides for a subsidy to those states which accept by legislative enactment the dollar for dollar coöperative plan. That is, each state must provide as much money as will come from the federal government on the basis of population. The amount appropriated was $750,000 for the year ending June 30, 1921; $1,000,000 for the year ending June 30, 1922; and the same amount for each of the next two years. In June, 1924, Congress voted to authorize appropriations for another three years, and in December of that year the deficiency bill included the necessary funds to continue this federal-state coöperative project. Thirty-six states have accepted (1925) federal coöperation, and with the continuance of the work assured, there seems to be no reason why the plan should not be put into nation-wide operation.

The project is still in its experimental stage, and varies in details from state to state. These must be perfected in the furnace of future experience. Of the far-sighted wisdom of the project there can be no doubt, for it means the abandonment of the policy of *laissez-faire* toward the crippled. If, in a few more years, we may have a nation-wide attempt to rehabilitate the injured person rather than to leave him to the mercies of a dole-giving public, we shall have gone a far way on a really constructive policy.

CRITICAL ANALYSIS OF COMPENSATION LEGISLATION

The principle of workmen's compensation, long delayed in the United States and bitterly contested as destructive of or contrary to our national traditions, is now generally accepted. Neither capital, labor, or public today deny its logic or necessity. But the details of the program are not yet worked out fully and satisfactorily. Extension of the system there must be to various groups not now included, many of its features need to be revised, and problems of administration met. Some of the outstanding problems will be reviewed briefly.

1. The most evident lack in workmen's compensation in this country today is the failure of several states and the District of Columbia to pass such legislation. In view of the world-wide acceptance of the principle of compensation, and its successful application for a number of years, there seems to be no justification for such delinquency in any part of the richest nation in the world. Even more flagrant than this is the failure to provide adequate compensation for all railroad employees either by the federal government or by the several states.

2. Still more important in point of numbers are the exclusions, explicit or implicit, of farm hands, casual laborers, domestic servants, and workers in so-called non-hazardous industries or in establishments employing less than a specified number of workers. All of these workers should be included, of course, under workmen's compensation laws. "The acceptance of the principle of occupational risk carries with it the inclusion of every species of industrial employment. Some occupations are less hazardous than others, but that injuries are few is no mitigation of hardship to those who are injured. A low degree of hazard implies a corresponding low cost of compensation, so that the exclusion of the so-called non-hazardous employments works occasional hardship and raises needless administration difficulties for no offsetting gain." [1]

The exclusion of particular industries or occupations from the compensation system is considerable. "According to esti-

[1] DOWNEY, *op. cit.*, p. 21.

mates made by Carl Hookstadt, of the United States Bureau of Labor Statistics, out of forty jurisdictions now having compensation laws, ten, including Porto Rico and Alaska, exclude more than half of the workers within their borders, while twenty-seven exclude at least one-quarter of their workers. These estimates are based on the assumption that all employers who may elect to come under the compensation laws do so elect. This gives a greatly exaggerated figure in many instances. It is probable that nearly one-half of all employees in the states having compensation laws do not come under those laws at all." [1]

Nor do such exclusions rest upon any consistent principle, such as degree of hazard, frequency of injury, or economic need. "The very laws which cover clerical office employees, hand cigar-makers, and watch manufacturers, exclude such hazardous employments as agriculture, coal-mining, and cotton-ginning. Agriculture and domestic service, in particular, are almost universally excluded from the American compensation system, either expressly or by the oblique device of exempting small employers generally. The ostensible ground for such exclusion is the administrative difficulty of applying a compensation Act to a multitude of farmers and householders, many of whom are but occasional employers. The real, though unavowed, motive is doubtless the political impossibility of passing a law which would be felt as a hardship by so large a fraction of the voting population. As a matter of political expediency, in the actually existing state of public opinion, the exemption of agricultural and domestic employers is probably inevitable, though such exemption is not to be justified on equitable grounds. The farm hand who loses his arm in a corn shredder, the domestic laundress who breaks her leg on the basement stairs, the country blacksmith's helper who is permanently disabled by a kicking horse—have the same ethical claim to compensation as any other class of employees has. The administrative difficulties in the way of

[1] Meeker, Royal, in *The American Labor Legislation Review*, Vol. IX, p. 35 ff.

covering petty employers are real, but may readily be overcome by an appropriate insurance organization." [1]

3. The waiting period before compensation begins is another feature of present legislation which needs revision. The loss of even a week's wages, which is the most prevalent period at the present time, creates a hardship or causes inconvenience to the average wage-earning family. Any delay in payment operates *pro tanto* to defeat the very purpose of a compensation system. Every consideration of public policy requires that relief shall be given when relief is needed. Not reimbursement, but support during disability, is the prime object of compensation. The malingerer, only possible excuse for delay, is for the most part a figment of an overheated imagination.

4. The benefit scale is the weakest feature of the American compensation system. In view of what has been said earlier about the adequacy of American wages, a compensation rate of 50 to 66 2/3 per cent of earnings is not exactly satisfactory compensation. Moreover, such percentage rates are virtually vitiated and nullified by the maximum provisions of most of the laws. For example, it is misleading to speak of a state paying 66 2/3 per cent of wages, as is the case in New Jersey, when the same law also provides a weekly maximum of $12. It is obvious, then, that instead of receiving 50, 60, or 65 per cent, the injured workman actually receives only 15, 20, 25, or 30 per cent of his wages. Of 4,579 temporary disability accidents in Pennsylvania, where the law allows 60 per cent of wages, only three-tenths of 1 per cent received 60 per cent, only 3.1 per cent received 50 per cent or more, and 66.8 per cent received 30 per cent or less of their wages.

The result of the various restrictions has been computed as placing upon the injured worker about 50 per cent of the burden of industrial accidents in the most favorable states, and from 65 to 80 per cent in those less favorable.[2]

Downey estimated that, taking the country as a whole and disregarding injuries not subject to compensation, the tem-

[1] Downey, *op. cit.*, p. 22.

[2] *Comparison of Workmen's Compensation Laws of the United States as of January 1st, 1925, Bureau of Labor Statistics*, Government Printing Office, Washington, Bulletin No. 379, p. 10.

porary disability benefit is not more than one-fourth of the wage loss.[1]

Compensation for permanent total disability is even more inadequate, except in those states which provide a straight-life pension. In the states not so providing, the general period during which compensation is paid covers about one-third of the remaining life expectancy of the average person thus incapacitated. Because of the comparatively recent dates in which the laws went into effect, this problem has not yet been raised to any great extent. But during the next ten years the designated periods will be expiring in many states, and the question of what further action will be taken must be faced.

One other aspect of the benefit feature of compensation laws calls for comment. Current wage rates are an inapplicable measure of wage loss over long periods of time. These Acts are being administered over periods during which the purchasing power of the dollar changes, usually falls. This becomes a serious matter during a period of rapidly rising prices, and in cases of death or permanent disability periods of compensation. Fifty per cent of wages earned in 1916 means something entirely different under 1925 wage and price scales. This is a difficult problem, for periodic revision of all awards for death or permanent disability would entail insuperable administration difficulties, employers could never determine the proper charge to be made in production costs, and the calculation of insurance rates would be impossible.

5. Another problem, and a very important one, in workmen's compensation, is that of administration. For the administration of these laws, most states have created commissions with fairly broad powers; only nine states retain the British system of adjudication by the ordinary courts. These commissions or boards are composed usually of three or five members and a staff of employees. Their actual duties and work vary in the several states, but are mainly supervisory.

While the work of compensation boards compares favorably

[1] Downey, *op. cit.*, p. 149.

with other branches of public administration in this country, their work leaves much to be desired. "One of the factors which militates against efficiency of administration in industrial commissions is the system of partisan political appointments. The personnel of many commissions is constantly changing with the change of political administration. In one state, for example, there have been seventeen commissioners since the creation of the commission in 1911. This continual change in personnel prevents a continuation of policy. Commissioners frequently hesitate to undertake important and constructive policies when their probable tenure in office is only three or four years. Furthermore, this change in personnel affects not merely the commissioners themselves, but the entire staff of the commission." [1]

Probably the greatest handicap suffered by state industrial or compensation commissions is inadequate salaries and appropriations. No commission can perform its functions properly or furnish adequate service if it does not have sufficient appropriation to carry on its work and if the salaries provided are so low that high-grade employees cannot be retained. In fact, most of the state commissions serve as recruiting grounds for private employers and especially the private insurance companies. Particularly do ill-trained, and an inadequate number of, field investigators make it impossible to obtain the facts necessary for a satisfactory adjustment of cases.[2]

CONCLUDING SUMMARY

The present compensation systems in our states may be measured by two different standards. Compared with the situation which obtained fifteen years ago, they represent a great advance. The law of negligence with its cloister-conceived offsprings of assumed risks and fellow-servants has been displaced by the principle of industrial and social responsibility. Under this new dispensation, a far greater proportion of injured persons receive compensation, payments are

[1] HOOKSTADT, CARL, "Comparison of Workmen's Compensation Insurance and Administration," *Bureau of Labor Statistics*, Bulletin No. 301, 1922, p. 5.
[2] *Ibid.*

relatively prompt, and the funds expended go to those injured rather than to claim agents and shyster lawyers.

On the other hand, measured by any adequate standard for the indemnity of work injuries, our compensation laws leave much to be desired. Some of the more outstanding deficiencies have been indicated. It would be futile to deny or to minimize them. Adequate compensation will be attained as fast as public opinion is educated to the economy and necessity thereof. No far-reaching reform was ever carried out until its justice and expediency had become a part of the general conviction of the people.

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CHAPTER XX

THE PREVENTION OF INDUSTRIAL ACCIDENTS

Adequate compensation for injuries in industry is highly desirable. Such compensation, however, is costly, and as this and other liabilities of modern industry are growing, it is necessary that efforts be made to lower the cost of insurance through the reduction of accident rates. The prevention of accidents is both more humane and more economic than their compensation. It is to this preventive aspect of the problem, with the requisite emphasis upon causation, that the present chapter is devoted.

THE EARLIER PHILOSOPHY OF "FAULT"

"So you've come to Pittsburgh to study accidents, have you? Well, I've been in this business fifteen years and I can tell you one thing right now—95 per cent of our accidents are due to the carelessness of the man who gets hurt. Why, you simply wouldn't believe the things they'll do. For instance, I remember a man . . ." [1]

Some such statement generally greeted Miss Crystal Eastman when, in 1907, she went to Pittsburgh to study industrial accidents as a part of the survey of that city made by the Russell Sage Foundation. The superintendents, claim agents, or general managers who made these statements were but reflecting the attitude held by the great body of the American people toward the subject. Men were injured "of their own fault"—*i.e.*, willfully. "Carelessness" was put down as the cause of the accident in the great majority of cases, meaning by that term that those injured knew better but deliberately brought on the accident.

This attitude fitted in with the individualistic temper of

[1] Eastman, Crystal. *Work-Accidents and the Law*, The Russell Sage Foundation, New York, 1910, p. 84.

our people. Moreover, prior to the passage of the workmen's compensation laws, it was necessary to allocate blame for accidents. It was the "fault" either of the employer or of the employee. To blame the dead or injured man was the easiest solution. Witnesses to industrial accidents were most always fellow-employees, and to give testimony against one's employer may prove easily to be a serious matter—that is, if one values his employment. It is obvious, then, that the older system of compensation by the courts in accordance with the principles of the common law hithertofore described was such as to make it advantageous to all concerned, save one person, to place the blame upon the injured party—and that one was the injured party. Small wonder that accidents so generally were the "fault" of those injured. It was an iniquitous system.

THE PRINCIPLE OF CAUSATION

As a matter of fact, such an interpretation is always incorrect. Condemnation, like fatalism, is the philosophy of ignorance. We think in terms of blame when we do not know the causes of that which we censure. The following case, taken from the experience of safety work in an American industry, aptly illustrates this point.

"Even girls with high-heeled shoes should not have fallen down that stairway. It was a straight flight, placed where you would expect it to be; it was well lighted and guided by a hand rail. The steps were wide enough, and covered with safety treads. Surely it had no hazard in itself; and yet clerks, perfectly familiar with the fact that others had been injured there, and accustomed to using the stairs every day, on several occasions plunged headlong the whole length of the flight. We held many indecisive conferences at the Aluminum Castings Company about these stairs, which seemed to have the very devil in them. One day we happened to measure the width of the steps to compare with another flight. We were surprised to learn that the first step below the landing was two inches wider than all the rest below it. The secret was then out. A girl would take her first step down, looking

where she put her foot, and adjusting it to the usual position on the edge of the step. Subconsciously she noted the width, and assumed that all of the other steps were exactly as wide. Then she placed her foot on the next lower step two inches too far forward, lost her balance, and came tumbling down to the bottom." [1]

Broadly speaking, the injuries which arise in the course of employment are nobody's "fault," in a personal sense. Workmen do not intend to commit suicide, nor do employers desire the death or maiming of employees. "Every accident, it is true, may be ultimately traceable to some act or omission, some want of foresight or insight, some failure of attention, skill, or care on the part of some human agent. But this is only to say that to omniscience the unexpected does not occur." [2] Accidents, then, are phenomena to be understood. Any other attitude is unscientific and futile.

COMPENSATION AND THE NEWER ATTITUDE TOWARDS ACCIDENTS

Modern compensation legislation places the burden of accidents upon industry as one of the costs of production. Accidents, in other words, are made expensive—to industry. It is through the payment of compensation that the cost of work injuries is brought home to the employer. A high accident rate means a high insurance rate—*i.e.,* this particular item in the cost of production is high. Accident prevention thus becomes a business proposition. One of the principal objects back of compensation legislation is to stimulate interest in the prevention of accidents, and such laws have given everywhere a notable impetus to the safety movement. The higher the benefits, the greater, of course, will be the incentive to preventive efforts. Full indemnity for deaths and permanent disabilities is particularly important in this respect. To ordinary humanitarian motives is added the realization that the prevention of accidents is the only effective method of reducing the burden which the compensation system imposes.

[1] Fisher, Boyd, *Mental Causes of Accidents,* Houghton Mifflin Company, Boston and New York, 1922, pp. 1, 2.

[2] Downey, *op. cit.,* p. 8.

Prevention means the elimination or control of causes, and this necessitates that real not alleged causes be made the basis of safety work. Progress in the prevention of accidents is dependent, therefore, upon increased knowledge of the causes involved. The principle of causation is, consequently, being forced upon the managers of industry. Just as the common-law system made inevitable an interpretation of accidents in terms of blame, so workmen's compensation laws put a premium upon a more scientific approach.

FACTORS IN A SCIENTIFIC APPROACH TO WORK ACCIDENTS

When the idea of a scientific study of industrial accidents first appeared, it was interpreted apparently to mean that the employer rather than the employee was at fault. This assumption, no more than the earlier one, is correct or scientific. A real scientific approach to this subject involves an appreciation of the importance of three groups of factors. First, there is the industrial or occupational background. What conditions in it are favorable to a high accident rate? Second is the personal element. What of the men at work under these conditions? Finally must be considered the relationship between a particular job and a particular worker.

Of tabulations of the nature of injuries, whether mechanical or non-mechanical, whether resulting from falls, slips, or set-screws, whether attributable to explosives or mine gas—there are many which the student may compile. But of case studies of individual accidents, from a scientific point of view, with the sole purpose of determining all the factors in each case, there are relatively few. The study of the real causes of industrial accidents in this country is still in its infancy. And yet this must be the first step if any appreciable progress is to be made in the prevention of such injuries. In the absence, then, of such data, what can be offered are for the most part not proven conclusions, but suggestive indications.

(1) *The Industrial Background*

The modern workman finds employment under conditions established by some one other than himself. The place of

work, the machinery, materials, equipment, etc., all are provided for him by the employer, who, in addition, selects the personnel of the labor force which he joins, and directs the processes and operations in which he engages. "Whether the whole shall be conducted with a view to safety or with an eye single to profit, whether the working-place shall be sanitary or unsanitary, the machinery well or ill guarded, the processes extra-hazardous or as free from danger as extant technology will admit—are circumstances within the discretionary control of the employer. It is for the employer to decide whether coal shall be undercut or blasted off and solid, whether explosives shall be fired with fuse and caps or with electric batteries, whether gears shall be covered or exposed, and whether hides shall bear the menace of anthrax or be disinfected before handling. Upon the active interest of employers, therefore, depends all effective effort for industrial safety." [1]

The number of accidents in any establishment bears a direct relationship to the hazards which exist in it. Taken as a whole, there is a wide divergence of opinion as to the relative importance of the industrial background, ranging from 10 to 75 per cent. Undoubtedly the percentage varies from one form of industry to another and between establishments within a given industry. Downey concludes that "in manufacturing industries as a whole mechanical equipment accounts for 60 per cent of the total accident cost," [2] and that extensive changes in the mining industry would reduce by half the number of fatal accidents per million tons of coal.[3]

The Role of the Engineer.—Two facts stand out clearly as a result of honest safety work in recent years. One of these is that the "irreducible minimum" in accident rates is considerably lower than had been supposed, and the other is that the chief factor in its reduction, particularly in the rates of serious injury, is the application of engineering skill.

"The prevention of occupational accidents and disease is primarily an engineering problem, and as such is reducible to terms of pecuniary cost. Industrial safety depends much more

[1] Downey, *op. cit.*, p. 122.
[2] *Ibid.*, p. 127.
[3] *Ibid.*, p. 130.

upon the construction of plant and equipment, the choice of materials and processes, and the safeguarding of machinery than upon the discipline and training of employees. The surest prevention is the removal of hazards. Care in the presence of needless danger is at best an uncertain reliance. So long as grade crossings exist collisions will recur despite all admonitions to stop, look, and listen, and so long as lead glazes and enamels are used pottery and enamel workers will continue to die of lead poisoning. How far this general principle reaches will be apparent from a review of work injuries in any basic industry." [1]

Beyer, in agreeing that much responsibility must be placed upon the engineer for efficiency in construction and operation, calls attention to a practical aspect of the problem. "New machinery is being installed constantly in mills and factories, in an unprotected state, merely for the lack of definite specifications calling for proper safeguards at the time the machinery is ordered. Many manufacturers have patterns for gear guards, etc., which they will furnish with their machines if requested to do so, but otherwise will omit.

"Machinery is commonly purchased on a competitive basis, the lowest bid determining who shall get the order; this furnishes a strong incentive to build at the lowest possible cost, and one way to lower the cost is to leave off safeguards. Thus the progressive machinery manufacturer, who would like to protect his equipment in a first-class manner, is frequently handicapped by the low standard set by his competitors, who are satisfied to build cheaply at the expense of safety.

"Machine safeguards can be furnished at the least outlay by the manufacturer of the machine, who can distribute the cost of patterns, etc., over a number of machines. He can also make the safeguards an integral part of the design, so as to secure the best results from the standpoint of appearance and convenience in arrangement.

"Where a machine is installed without protection, the situation is unfortunate for several reasons; if guards are provided by the purchaser, it is often difficult to adapt them to a ma-

[1] Downey, *op. cit.*, pp. 122-123.

chine which was not arranged for them in the beginning; furthermore, the local mechanical forces are usually limited in number, and so occupied with their current duties that it is hard to find time for extra work of this sort; where they do make up guards, the latter are apt to be unsightly and unsatisfactory, unless given considerable thought and attention by a man specially skilled in this line of work. Worst of all, some one is liable to be seriously injured before the guards are installed.

"The solution of the whole difficulty lies in the use of proper specifications. This is of value to the manufacturer of machinery as well as to the purchaser, since it tends to put all bids on a parity; in submitting a quotation, the manufacturer knows that all competitors must figure on the same equipment. On behalf of the machinery builders, it can be said that most of them are entirely willing to coöperate in this work; in fact, they have adopted many precautions on their own initiative, in spite of the competitive conditions mentioned above. A good example of this is furnished by the familiar types of machine tools; one need only compare modern machines with those built a few years ago, to note a radical improvement in safety features." [1]

Human Engineering in Industry.—There is, however, another kind of engineering which is also of great importance in the prevention of work accidents. This concerns itself primarily with efficiency in the operation of the human element in industry.

Fatigue apparently shows a high correlation to increases in accident rates, and it is entirely reasonable to accept the conclusion of a causal relationship between the two. A number of studies of such relationship have been made in the last fifteen years, and there seems to be general agreement that, all other things being equal, weary and overtired workers are less careful, less accurate, less resourceful, less alert, and consequently more prone to mishaps in the course of their work.

[1] Beyer, David S., *Industrial Accident Prevention*, Houghton Mifflin Company, Boston and New York, 1916, p. 13.

"Most of the tabulations that have been made agree in showing that as output diminishes in each spell, coincident with the progress of fatigue, accidents increase in number—the curve gradually rises through the spell." [1]

This conclusion has been attacked on the ground that in the final hours of the working spell, when fatigue should be at its height, the accident curve is falling. This criticism is disposed of rather effectively, however, in a study made by the United States Public Health Service, in which an index figure is worked out, showing the hourly accident rate per unit of output. This presents a striking contrast to the customary accident curve, for although in the latter hours of the work spell or day the accident rate declines, yet the rate per unit of production shows an increase. Furthermore, it is shown that piece workers are more liable to accidents than those on day work, and inasmuch as piece workers may be presumed to extend themselves more and fatigue themselves more, it is safe to say that such figures indicate a relation between fatigue and increased accidents.[2]

In the division of productive processes into simple, detailed tasks, the chief premium is put upon speed of operation. "Monotonous, speeded-up operations in connection with dangerous machinery are found in 'the manufacture of nearly every article of use or comfort with which our lives are surrounded—in the manufacture of that piano, the chair you are sitting on, the watch in your pocket, the car you ride in, the sewing-machine, the meat you ate for your breakfast this morning.'" [3]

Speed is a contributing cause of accidents, both because it leads to fatigue and because it increases the exposure to risk. Haste means taking chances. Hurry is another name for carelessness. Carelessness is not an ultimate cause, says Elizabeth Butler, but a resultant from any one of a multitude of

[1] LEE, F. S., *The Human Machine and Industrial Efficiency,* quoted by FISHER, *op. cit.*, p. 222.

[2] "Industrial Accidents," *Monthly Labor Review*, May, 1920, p. 161.

[3] BOGARDUS, E. S., "The Relation of Fatigue to Industrial Accidents, Reprinted from the *American Journal of Sociology,* Vol. XVII, Chicago, 1911, p. 19.

things, one of which is the haste and disregard of personal risk resulting almost inevitably from a piece-work system.[1]

One can check up the essential fact involved from personal experience. The faster we work, the less accurate that work is likely to be. The more attention is focused on speed, the less it can be focused on safety. The greater one's hurry to arrive at a designated place, the less ordinary caution one uses, let us say, in crossing the street. Haste is the chief element, particularly in that deliberate failure to take a precaution which we call recklessness. The British Health of Munition Workers' Committee concluded that "varying speed of production is the factor largely responsible for the day-shift variations of accidents to men. . . ."[2]

The importance of long hours of labor, too, becomes at once apparent. Statistical studies clearly evidence this commonsense conclusion, and court decisions reflect it. Time after time has the Interstate Commerce Commission emphasized long hours of labor as a cause for railroad accidents. Similar, too, is the report on accident rates as working shifts are shortened from twelve to ten, and from ten to eight, hours per day.

In summary of the foregoing discussion, it seems pertinent to cite the conclusions of the federal study, previously quoted:

(a) In the absence of fatigue, accidents vary directly with speed of production, owing to increased exposure to risk.

(b) The breaking of this regular variation by fatigue is indicated by: (1) The rise of accidents with the fall of output. (2) The disproportionate rise of accidents with the rise of output, and the lack of proportionate fall of accidents with the fall of output in the final hours of the day.

(c) The importance of fatigue in the causation of accidents is emphasized by the fact that the higher accident rate

[1] Butler, Elizabeth, *Women and the Trades,* Russell Sage Foundation, New York, 1909, p. 108.

[2] "Industrial Health and Efficiency," *Final Report, British Health of Munition Workers' Committee,* Government Printing Office, Washington, 1919, p. 139.

accompanies the deeper decline of working capacity: (1) In the second spell as compared with the first. (2) In muscular work as compared with dexterous and machine work. (3) At the ten-hour plant as compared with the eight-hour plant.[1]

(2) *The Personal Element in Work Accidents*

As "engineering revision" progresses in the production of a "fool-proof" environment in industry, the emphasis in a scientific approach to accident prevention shifts increasingly to the personnel in that environment. It has been shown already that certain conditions of work, such as those resulting in fatigue, are determining factors in the behavior of that personnel. Other factors, however, must be considered.

The Spirit of the Job.—Perhaps one can do no better in beginning a study of the personal element in work accidents than to recall that carelessness is a requisite in jobs in which men are constantly facing danger. The same psychological weakness or strength which makes a man a good soldier makes him a good structural iron worker or a strong-nerved engineer. Moreover, if a hundred times a day a man is required to take necessary risks, it is not in reason to expect him to stop there and never take an unnecessary risk. Many positions beget a spontaneous, impulsive kind of recklessness, the moving spirit of which is daring. Rules for playing the game develop. Extreme caution becomes as unprofessional among workers in dangerous occupations as fear would be in a soldier.

"The example most commonly used to show a brakeman's recklessness is his custom of standing in the middle of the track to board a yard engine that is coming toward him. Although rules are often posted forbidding this, they are universally disregarded. Most railroaders would agree with the brakeman who said to me:

"'You see, getting on in front, your foot touches the footboard first, so if you slip there is no chance of saving yourself. Getting on at the side, you take hold of the grab iron first, so if your foot slips there is some chance of hanging on. Yet I

[1] "Industrial Accidents," *Monthly Labor Review, op. cit.*, p. 161.

always get on in front myself. We all do. It's easy and simple. There is a kind of fascination about it. You win or you lose. It's a gamble. And then, it's not professional to get on at the side. No good railroader does it.' " [1]

The American Disposition to Take Chances.—Some such recklessness is a part of the American creed. Certainly it cannot be said that the workman absorbs cautiousness from the spirit of American life. "The average American is disposed to take chances. He does not always consciously intend to do so, but his nature is headstrong. He may even openly and honestly assent to 'Safety First' preaching, serve on committees, or even sometimes direct such work as a safety engineer, while himself an inbred dare-devil. From the earliest childhood, the American boy is taught to do the risky thing. He skates on the first thin ice of winter, being the more gleeful about it because it is thin ice. In the summer he takes high dives into shallow water, attempts to climb the highest tree, and, while playing circus, attempts impossible stunts to thrill his onlookers. He goes to the movies and sees Douglas Fairbanks walk the peak of the roof, barefoot, bearing a lady in his arms, or, with his single trusty blade, dispose of nine cutthroats at a slash; and the young hopeful is minded to do like deeds of derring do. He sees photographs in the Sunday papers of airmen jumping from one plane to another, thousands of feet above the ground, and then goes out and tries his little darnedest to duplicate the spirit of the stunt. A few years later, when he learns to drive a motor-car, his measure of achievement is the speedometer. He thinks it particularly skillful, moreover, to be able to drive with only one hand on the wheel. As he grows older, he drinks and engages in other pastimes, quite as much in a spirit of daring as in response to wayward prompting. 'Steve Brodie took a chance,' is one of his mottoes. And another is, 'I will try anything once, and, if I like it, I will try it again.'

"This philosophy soon becomes second nature, and when a war comes we praise the results it produces in the courage, ardor, and light-heartedness of our soldiers. We proclaim it

[1] EASTMAN, *op. cit.*, p. 24.

abroad as American grit. We immortalize it as the Spirit of the Argonne. Then we bring our young men together in factories and begin telling them: 'Don't get hurt'—'Take care of your hide'—'Think safety'—and expect them to do so because we put up a sign.

"Is it surprising that men who attend melting furnaces in factories have to be watched steadily to persuade them to wear goggles to protect their eyes from splashes of hot metal? Is it to be wondered at that window-cleaners, perched high up on the outside of a building, neglect to attach their safety belts to the hooks on the window frames, when tremulous crowds applaud their reckless courage?" [1]

The Puzzled Mind in Industry.—Fisher [2] has applied this rather apt term to that frequently found type of worker who is projected into modern industry without adequate equipment to meet its requirements. The three factors chiefly responsible for this condition of mind are inexperience, language difficulties, and mental limitation.

1. *Inexperience.* "Go to work on D-131 over in the corner there," is likely to be the only instruction given to the beginner.

"Inexperience is, indeed, a prolific source of accident. In a textile mill of which I have statistics, two years ago 456 per cent of persons who had served less than one month with the company were injured. And, in another mill, 181 per cent of those employed, on the average less than three months, were injured. This, of course, includes minor ailments causing no lost time, but all of my figures show that the inexperienced man is much more disposed to accidents than the old-timer. . . .

"Startling figures on the rate of accidents per day among new workers were furnished in a report on women in the metal trades. Among press hands the average number injured the first day was 329. This rate dropped steadily with experience, till after seven months the rate dropped to .47 (less than 1) per day.

[1] Fisher. *op. cit.*, pp. 80-82.
[2] *Ibid.*, Chapter II.

"An unpublished study which was made of the statistics of the Carnegie Steel Company, Youngstown Sheet and Tube Company, International Harvester Company, Fairbanks, Morse, and several other companies, showed that new employees of less than one month's service were six times as liable to injury as those at work over one month. Economy of effort in accident prevention would counsel a concentration of attention upon newcomers. Ignorance due to inexperience is the most prolific mental cause of accidents." [1]

Similar is the conclusion of a study of accident causes and prevention over ten years in the iron and steel industry. "Wherever it has been possible to isolate groups of relatively inexperienced men it constantly appears that accident rates are in some degree proportional to the lack of experience on the part of the worker. Whenever the 'new-man accession rate' is high, accident rates will rise, and a decline nearly always sets in whenever the 'accession rate' begins to decline. Extreme inexperience is particularly likely to show high accident rates. Whenever business depression comes on, the less desirable man will be the first to go. The result will be a force of relatively greater experience and of more reliable character. This influence must be quite important in the lowered accident rate of periods of depression." [2]

Two recently made studies reaffirm this conclusion. One, made by the United States Bureau of Mines from data obtained from the records of two large mining companies, shows that 48.1 per cent of injuries occur during the first two months of employment and that 20.5 per cent occur during the first week. The other is a study of the relation between labor turnover and industrial accidents, reported in the *Journal of Industrial Hygiene* for July, 1923, and disclosing that in 1921 accidents occurred among all employees with a ratio of one to every four, whereas they occurred among new employees with a ratio of one to each one hired.[3]

[1] Fisher, *op. cit.*, pp. 34-36.

[2] Chaney, L. W., *Causes and Prevention of Accidents in the Iron and Steel Industry*, 1910-1919, Government Printing Office, Washington, 1922, p. 9.

[3] Summarized in *The American Labor Legislation Review*, September, 1924, p. 249.

2. *Language Difficulties.*—Almost two decades ago, the Immigration Commission, in commenting on the effect of the employment of non-English speaking workers in American mines upon accident rates, pointed out that "there seems to be a direct causal relation between the extensive employment of recent immigrants in American mines and the extraordinary increase within recent years in the number of mining accidents. . . . When the lack of training of the recent immigrant while abroad is considered in connection with the fact that he becomes an employee in the mines immediately on his arrival in this country, and when it is recalled that a large proportion of the new arrivals are not only illiterate and unable to read any precautionary notices posted in the mines, but also unable to speak English and consequently without any ability to comprehend instructions intelligently, the inference is plain that a direct causal relation exists between the employment of recent immigrants and the increase in the number of fatalities and accidents in the mines. No complete statistics have been compiled as to the connection between accidents and races at work, but the figures available clearly indicate the conclusion that there has been a direct connection between the employment of untrained foreigners and the prevalence of mining casualties." [1]

In the years since, this relationship has been shown to exist not only in mining, but throughout the field of industry. In a period of eight years, the accident records of a large steel company showed a definite connection between lack of knowledge of English and accident hazard. Non-English speaking workers showed a frequency rate 2.3 times that of American-born and a severity rate 1.4 times as high.[2] Another plant, a machine-building concern, showed a three-year average of 60.6 accidents per 1,000 American-born workers as against 101.7 among the foreign-born group.[3] Teaching foreign-language workers to speak English, according to the experience of

[1] *Abstracts of the Report of the Immigration Commission, op. cit.*, Vol. I, p. 539.

[2] "Industrial Accidents and Hygiene," *U. S. Bureau of Labor Statistics,* No. 237, June, 1918.

[3] *U. S. Bureau of Labor Statistics,* Bulletin 216, August, 1917.

the Ford Motor Company, led to a 54-per-cent reduction in accident rates during the first five years of the operation of their school.

"The teaching of English to foreigners has an additional value owing to the fact that so many of them are illiterate in any language. In the ten-year period from 1899 to 1909, when illiterate foreigners were still being admitted by the immigration laws, of all the foreigners who came to this country, 54.2 per cent of the south Italians could not read or write their own language. Of the Ruthenians, 51 per cent were illiterate; of the Lithuanians, 48.8 per cent; of the Croatians and Slovenes, 36.4 per cent; of the Poles, 35.4 per cent; of the Greeks, 27 per cent; and of the Jews, 25 per cent—were totally illiterate in any language. And at the present time, when the importation of illiteracy has been abated, the figures for our foreign-born workers show an appalling amount of total illiteracy. With such ignorance, it is futile to transform safety bulletins even into foreign languages. The Americanization classes are, for many foreigners, their first schooling in any tongue."[1]

3. *Mental Limitation.*—In the early decades of the Industrial Revolution, a large proportion of the employees were children, many of them being very young. The division of industrial processes into simple tasks made possible the utilization of their labor. Since then considerable progress has been made in many industries in the further subdivision of labor. It is easy to understand, therefore, that the adults who subsequently took the places of these children possess frequently only child-like intelligence and still do acceptable work. Especially is this true in the unskilled and semi-skilled occupations.

This fact of limited intelligence has not been given much recognition in the industrial safety movement. The worker who "catches on" quickly, who seems almost never to have been a beginner, is a *rara avis.* The fact that men "get by" on the job is no evidence of adult intelligence. Many a worker of limited intelligence who "gets by" under the simple

[1] FISHER, *op. cit.*, p. 40.

and routine requirements of his work does not have the capacity to grapple successfully with extra-routine circumstances. Accident hazards, as Fisher reminds us, are not routine. "The emergency calls for the keen mind, and comprehension of instruction as to how to prepare for emergencies demands a higher level of intelligence than the normal conduct of the job. Ability to do a job, therefore, is not in itself a guaranty of intelligence sufficient to rate the possessor as a low accident risk." [1]

Widespread low intelligence, revealed by an increasing number of group tests, is as significant for industrial managers as for school men and social reformers. The great trouble is that in the past we have hired workers and waited for experience to show which were accident hazards and which were not. The question now arises whether such identification can be made in advance. Certainly no one with any knowledge of recent advances in psychological science would deny such a possibility.

Once the concept of the puzzled mind in industry is grasped, the full relationship of labor turnover, child labor, inadequate instruction, immigration, irrational selection of employees, and high accident rates is obvious, as well as the nature of effective safety work.

Mentally Resistant Workers.—In addition to that large number of workers who are handicapped in adjusting themselves to the industrial environment because of inexperience, language difficulties, and mental limitation, there is another large element disposed to accidents because of misdirected education rather than the lack of it. This element consists of workers who have acquired in some way or other queer mental twists or quirks which offer a mental resistance to safety teachings and the promptings of ordinary caution. They know what " ain't so"—a condition much worse than ignorance.

Some men, for example, are reckless because they are fatalists. Perhaps a majority of workers today believe that they are foreordained to die on a certain day, "and that till

[1] Fisher, *op. cit.*, p. 40.

then the Lord will protect them up to the very hour. 'I figure, if your time has come, you are bound to go, whatever you do,' they will say. And the implication and belief are that one may flirt with death with impunity up to that time. Reënforcing this fatalistic belief is the experience everyone has had with 'close calls' which resulted in no damage." [1]

Modifying the fatalistic philosophy of many workers is the belief in a Providence that may be propitiated. "In their faith, misfortune isn't exactly foreordained; it may be done up in a package with your name and address on it, but it may not actually be sent to you. If you avoid walking under a ladder, or have a care not to break a looking-glass, and manage to look at a new moon only over the right shoulder, you will escape bad luck. Few men and woman admit superstitions, but fewer still will flout them. This is really significant. It represents a vast influence in the unconscious mind of the people, a common inheritance of religious beliefs imbedded in the race since savage times. It is even taken over as a respectable element of more recent religions, most of whom, by their prayers, admit a belief in a Special Providence that looks after small concerns of individuals.

"The number of men who wear charms, rabbits' feet, relics or talismans over which a blessing has been spoken, or carry lucky coins, is undoubtedly greater than all the men who practice Safety First. Sailors and soldiers carry mascots with them as some sort of added protection in battle. In popular legend, the number of enemy bullets that have been stopped, just short of piercing a brave heart, by the Providential interposition of a pocket Testament or a sweetheart's picture surely equals the total number of fatalities.

"These superstitions are important as a factor in creating indifference to, or skepticism about, safe practices. They lie at the root of the dangerous fallacy that all accidents are accidental. They are responsible for most of the inertia which safety men encounter when they first attempt to interest a group of employees in measures of self-protection." [2]

[1] Fisher, *op. cit.*, p. 83.
[2] *Ibid.*, pp. 84-85.

Another resistance is that begat by resentment or suspicion. There are workers who resist safety teachings and practices as an infringement upon their "natural" rights. They resent innovations or consider such rules as those requiring them to wear goggles as a reflection upon their intelligence. Other workers may resist subconsciously safety instructions because they are sudden radicals and wish to believe nothing told to them by capitalistic employers. Or there may be unnatural timidity, a fear to ask the foreman for instructions necessary to avoid accidents.

"The chief mental resistance to good safety ideas—aside from recklessness—comes from so-called chronic kickers. They are the skeptics, grouchers, 'icemen'—however they may be nicknamed—which we find in every organization. Whether their obstructionism merely takes the shape of objecting to new things and ideas, which is a form of laziness growing out of the middle-age instinct to protect our habits from disturbance, or whether it takes the form of positive ill-will, such as taking new proposals as grievances, involving threats of strikes, demands by walking delegates, or breaches of discipline and sabotage—the protest of the chronic kicker is an expression of an 'attitude' which helps to bar the way to a program of action for safety." [1]

Accidents and Alcohol Addiction.—No one familiar with industrial operations doubts the importance of alcohol addiction as a contributing cause of accidents. The attitude of safety men, particularly, is pronounced, and to their conviction the resolutions which they have adopted from time to time and the propaganda they have initiated bear eloquent and emphatic witness. It is a fact, frequently overlooked yet not unimportant, that more of the pressure which led to national prohibition came from industrial than from moral sources.

In the days before prohibition, one of the favorable locations for saloons was in the neighborhood of work establishments. Almost the last thing which the worker in a plant of any size passed before entering it was a saloon. Small wonder

[1] FISHER, *op. cit.*, pp. 90-91.

that the employer, especially after the advent of compensation legislation, wished to rid the neighborhood of his plant of this constant and insidious menace.

The use of alcohol bears upon accident rates in many ways. Exhaustion or low vitality resulting from excessive use, the mental state of the "hang-over," lessened accuracy, decreased alertness to meet emergencies, slower reactions to stimuli—all of these are important in connection with accidents.

Other Factors Influencing the Personal Element.—Many other factors and conditions influence the personal element in relation to accident rates. Fisher, in his penetrating analysis of the mental causes of accidents, speaks of the Unguarded Mind, the Involuntary Mind, the Diverted Mind, the Physical Mind, and the Troubled Mind, in addition to those conditions already discussed in this chapter.[1]

By the Unguarded Mind is meant the worker disposed to accidents primarily as a matter of temperament. Some workers react too quickly, some too slowly. A highly responsive temperament, with complementary periods of depression, may be quite as dangerous as the phlegmatic one which cannot "step lively" in dangerous situations.

The Involuntary Mind is another name for habit. Conscious control of activity is clumsy, slow, and unpredictable. Habit is the key to efficient work and to safety. Good habits counteract faulty thinking, and so *vice versa.* Military experience tends to show that human material is less important for military success than methods of training. Faulty habits, which cause the mind and hand to fail and the morale to weaken at the critical time, have a causal connection with high accident rates. Hurry is a habit.

The Diverted Mind and the Troubled Mind are preoccupied minds. "Preoccupation means the surrender of the mind to claims of feeling or mental habits which are stronger in their influence than anything in the present situation. It is an emotional hang-over from some situation or physical condition which continues to excite the mind, even after the crisis has passed. It interests us in relation to accidents because

[1] Fisher, *op. cit*, Chaps. I, V, VI, VII, and VIII.

so often the worker imports into the plant with him part of the drama of his life outside, reënacting his own difficulties at a time when he ought to be putting his mind on his work. It may be only an emotional strain or it may be an out-and-out insanity, but whatever the degree of preoccupation, a mind which is not 'to let,' so to speak, for new mental tenants, not ready to meet the situations that come up currently, is a mind predisposed to accidents." [1]

The Physical Mind is a mind depressed, a sluggish mind, due to disease, drugs, alcohol, faulty plant conditions, and the like.

(3) *Particular Men in Particular Jobs*

When compensation legislation decreed remuneration for injuries sustained at work, employers speedily became interested in the kind of men they employed. One immediate result of this interest was the extension of physical examinations of applicants for employment, to the end that bad compensation risks might be excluded. Obviously, a man suffering from hernia would be a bad risk on a heavy lifting job, and a case of cardiac disease would not be employed to run an elevator. Today, physical examination is the cardinal feature of health service in industry.

Much of the work done in physical examinations thus far has been of a negative character. The kind of physical examination which medical men have known in the past was developed for purposes of life insurance or military service, both of which emphasized the idea of medical diagnosis. The type of physical examination which industry needs is concerned more with an appraisal of the worker's native equipment. Incipient tuberculosis is important, but even more so, for purposes of industrial placement, are sense defects, reaction times, and the rhythm of the individual.[2] To render full service in their primary purpose, industrial physicians must develop a new technique. To the extent they do so, their work will be basic in the identification of accident risks and

[1] Fisher, *op. cit.*, p. 25.
[2] Myers, C. S., *Mind and Work*, New York, 1921.

the guidance of such cases into positions where the risks are minimized.

Along with the physical is the mental examination. The idea of utilizing psychology in business is of European origin. It was from the mind of Wilhelm Wundt, of the University of Leipzig, that the United States received the first impulse to take up experimental psychology, and it was another German, Hugo Münsterberg, then at Harvard University, who in 1912 first formulated clearly and fully the problems and programs of an industrial psychology and suggested the experimental technique for the application of this new science. Then came the World War, which stimulated its growth very much. In all of the major countries involved, the psychologist was called upon to render service in the proper classification of army personnel and in the selection of men for service requiring special ability. Psychological work in industry has been narrower in scope in the United States than abroad. It is limited here largely to an analysis of job requirements and the selection of employees.[1]

The physician and the psychologist have been called to the service of peace-time industry. The achievements of both in this field are in the future, rather than in the present or the past. Both are destined to play decisive roles in the adjustment of the man to the job, the elimination of labor turnover, and a host of conditions which dispose men to be accident hazards.

THE EVOLUTION OF THE SAFETY MOVEMENT

It seems advisable at this point to review the development of the industrial safety movement in the United States, to take account of the various objectives emphasized in the successive stages of its evolution.

1. In the first stage, safety work was not taken seriously

[1] VITELES, M. S., "Psychology in Business," *The Annals of the American Academy of Political and Social Science, op. cit.*, November, 1923, pp. 207 ff. The student will find in this volume a number of valuable articles indicating significant recent developments in the application of psychology to business in general.

by industry. Under the old common-law system of compensation, there was no motivation for any genuine interest. Standards of safety had to be imposed upon industry by legislative enactment. Activities in this stage consisted of factory inspection by state officials, with the chief interest in the guarding of obvious machine hazards. Unless too honestly done, employers accorded a passive coöperation to such efforts.

2. The second stage came with the passage of workmen's compensation laws, when industrial concerns began to realize that accidents are costly and wasteful. Under the spell of the old idea that the chief cause was the carelessness of the worker, a continuous mass safety propaganda was undertaken among the working force to educate and stimulate its members to greater care and caution.

3. The third phase of the movement represents a partial swing of the pendulum, away from the idea of carelessness as the principal cause of accidents and education as the chief panacea, to the occupational environment again. It now came to be recognized that a large number of accidents were preventable by engineering improvements in equipment and methods of operation, and that such improvements bring increased efficiency as well as increased safety.

4. The fourth stage we are entering even now. Just as in the old days the restricted emphasis upon belt and gear guarding resulted from an inadequate conception of engineering possibilities, so it is coming to be seen today that mass education in safety work rests upon an inadequate conception of the complicated personality and psychology of those at work. Boyd Fisher, who insists that in the safety movement industry has reached the point of diminishing returns "from further efforts with broadside remedies and shotgun prescriptions," applies the terms "Accident Hygiene," rather than Accident Prevention, to this next step in safety work, and by it he means the technique for dealing with individual cases in special ways suited to each. The term seems an appropriate one.

ACCIDENT HYGIENE

Enough has been said in discussing the personal element in accident causation to make it clear that all workers are not alike in the problems which they present to the safety engineer. Some are tired, some are stupid, ignorant, or inadequately trained; still others are preoccupied, slow, stubborn, or depressed. Instruction and training, as well as placement, must adjust themselves to the differences among workers, seeking to help each type according to its needs, if satisfactory results are to be obtained.

Presuming that adequate diagnoses have been made, Fisher suggests eight types of remedies for an effective program in dealing with the personal element in industry. They are as follows: (1) job analysis, (2) improved working conditions, (3) better selection and assignment, (4) training, (5) organization, (6) periodic personnel surveys, (7) individual adjustments, and (8) accident "post-mortems." [1]

SUMMARY

In the beginning of the discussion of industrial accidents, it was pointed out that the toll of life and limb exacted by American industries during the second decade of the twentieth century exceeded the nation's losses in battle from the Declaration of Independence to the present day. Might it not, then, be advantageous if some part of the very commendable effort now being directed toward the abolition of war could be diverted into the channels of Accident Prevention and Accident Hygiene?

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[1] Fisher, *op. cit.,* p. 264.

Part Three

SOCIAL WELL-BEING AND MENTAL HYGIENE

CHAPTER XXI

MENTAL DEFICIENCY AND ITS SOCIAL SIGNIFICANCE

No one can go very far in a study of social problems without encountering the fact of mental deficiency. In the last two decades, particularly, its social significance has been greatly emphasized. The literature of this period on social problems has teemed with references to the feeble-minded pauper, the feeble-minded criminal, the feeble-minded prostitute, and the feeble-minded unemployed, until it seemed at times as if poverty, crime, prostitution, unemployment, and the like, are problems of psychiatry rather than of sociology.

Mental deficiency, amentia, mental defect, feeble-mindedness, and mental subnormality are the terms which have been used most commonly to indicate this mentally inferior element in the population, and they will be used interchangeably throughout this discussion since, to all practical purposes, they are synonymous. Following Tredgold,[1] preference is given to the term "mental deficiency" in the title of this chapter. While literally this term is as applicable to a decay as to a non-development of the mental powers, common usage restricts it to the latter condition.

Mental deficiency, as defined by Tredgold,[2] is "a state of restricted potentiality for, or arrest of, cerebral development, in consequence of which the person affected is incapable at maturity of so adapting himself to his environment or to the requirements of the community as to maintain existence independently of supervision or external support." Another definition, frequently cited, refers to it as "a state of mental defect existing from birth or from an early age and due to incomplete or abnormal development, in consequence of

[1] Tredgold, A. F., *Mental Deficiency,* William Wood and Company, New York, fourth edition, 1922.

[2] *Ibid.*, pp. 8-9.

which the person affected is incapable of performing his duties as a member of society in the position of life to which he is born." [1]

It will be observed that both definitions, as do most of those which have been formulated, combine two concepts—that of arrested mental development and that of inability to meet the ordinary demands of life. These concepts indicate the two chief approaches to, or interpretations of, mental deficiency, as well as the nature of the criteria used in its determination or diagnosis. One is psychological; the other, socio-economic.

THE PSYCHOLOGICAL CRITERION

THE CONCEPT OF ARRESTED MENTAL DEVELOPMENT.—The development of mind appears fundamentally to be a matter of the growth and development of neurons and neuron patterns. But the nervous system, which is the physiological basis of mental life, does not continue to grow indefinitely. Like all other tissues of the body, it "gets its growth." When this neuron elaboration becomes complete, the maximum mental development has been reached. Theoretically, every human being has the possibility of reaching this limiting point; but, as a matter of fact, many things may intervene to stop the development before it reaches this mature condition. Just as the body may cease to develop its stature before it has "had its growth," with the result that we have dwarfs, so may the mental development be "arrested" with an accompanying dwarfed intelligence.[2] As compared with those of normal mental development, the neurons of the mentally deficient are characterized by numerical deficiency, irregular arrangement, and a failure to develop to complete functioning capacity so that they are not able to acquire the neuron patterns which mean adaptation to the demands of the environment.[3]

In utilizing the idea of arrested development in this con-

[1] GODDARD, HENRY H., *Feeble-Mindedness: Its Causes and Its Consequences,* The Macmillan Company, New York, 1914, p. 4.

[2] GODDARD, H. H., *Psychology of the Normal and Subnormal,* Dodd, Mead & Company, New York, 1919, Chapters, I, II, III.

[3] TREDGOLD, *op. cit.,* Chapter IV.

nection, Hollingworth points out[1] that it must not be assumed that mental defectives progress normally to a certain point and then suffer arrest or cessation of development. "The histories of feeble-minded and dull children typically show that they are inferior and below par from the beginning. There is a very close relationship between lateness of walking and talking and inferiority of intelligence, as later ascertained. The same is true of all the important processes of development—dentition, sitting up, creeping, grasping, learning to be clean in personal habits. The subnormal child is behind the average from the beginning of his career. He is inferior from his birth, and suffers no arrest of a development which was progressing normally. This is true of all but the small group of cases where deficiency is due to disease. . . ."[2]

The Measurement of Intelligence.—The impetus given to the science of psychology in the last quarter of the nineteenth century by the experimental emphasis in the work of Wilhelm Wundt, and the growth of sociological interest in the peculiarities in the mental make-up of certain pathological groups, are the chief factors responsible for the development of the idea of mental measurement. The earlier experiments in this direction, made by Cattell, Thorndike, Kirkpatrick, and others, in America, and by Burt, in Great Britain, culminated in the work of Alfred Binet, Professor of Psychology in the University of Paris.

In 1904 it was decided to segregate for special instruction all of the mentally defective children in the schools of Paris. His professional services having been sought for this task, Binet undertook to provide a psychological criterion of mental deficiency, on the basis of which these children could be selected scientifically. From then on until his death in 1911, Binet's work was the center of interest for all those interested in mental testing, and it was his scale which first won universal recognition as a practical means for the measurement of mental ability. It was Binet, too, who took up the old

[1] Hollingworth, Leta S., *The Psychology of Subnormal Children,* The Macmillan Company, New York, 1920, Chap. VI.

[2] *Ibid.,* p. 102.

idea of comparing an individual in ability with a child, and made it concrete and definite in terms of mental age. The use of mental age as a measure of intelligence, and as opposed to chronological age, first introduced in his 1908 scale, is one of Binet's most important and valuable contributions to the problem of mental testing. And, be it added, few concepts in the development of mental measurement thus far have been more abused and misinterpreted.[1]

The Introduction of the Binet Scale Into America.—In 1908, Dr. Henry H. Goddard, then director of the psychological laboratory at the Training School for the Feeble-Minded at Vineland, N. J., visited Europe and became familiar with Binet's work and its application to feeble-minded children. Although skeptical at first as to their practicability, Goddard applied these tests after his return to this country upon the inmates at Vineland. To his surprise, he found that the grading of the inmates on the basis of the tests accorded closely with their classification on the basis of institutional experience. He set to work adapting Binet's scale to American conditions and standardizing it on the basis of an examination of 2,000 school children in the public schools of Vineland, N. J. In 1910, the first abstract of this revised scale was published by the Vineland laboratory. "The further practical application of the tests by persons who had become skilled in their use quickly proved their value, and with later refinements and revisions the tests soon came to be regarded as an indispensable aid in the diagnosis of mental deficiency." [2]

"This revision of Goddard's remained for a long time the standard for American practice. The Training School for Feeble-Minded Children at Vineland, where Goddard was director of the psychological laboratory, became the Mecca of all those interested in the new clinical psychology, and the storm center around which much of the heated discussion as to the validity of the Binet-Simon Scale raged. The work at Vineland was ably supported by other men, notably by

[1] PINTNER, RUDOLPH, *Intelligence Testing,* Henry Holt & Company, New York, 1923, Chaps. I and II.

[2] DAVIES, STANLEY P., "Social Control of the Feeble-minded," *The National Committee for Mental Hygiene,* New York, 1923, p. 43.

Kuhlmann and Huey, both psychologists attached to institutions for the feeble-minded. Without going into detail we may say that the emphasis at first was laid upon the use of the scale for the detection of feeble-minded children. Vineland led the way in using the scale as a means of classifying all the children in the institution, and very soon came to use it as a routine procedure for the admission of all new cases. From Vineland the use of the scale spread rapidly to other institutions. The point to note, however, in the early use of the scale is that for practical purposes its use was almost entirely restricted to the feeble-minded. Normal children were tested in the main solely for purposes of standardization. Some share of the prejudice against mental tests among the public at large must be attributed to this fact. To allow a child to be 'submitted' to a mental test was, and still is, to some extent, equivalent to raising the question as to the integrity of his intelligence, because mental tests were from the beginning so closely associated with the feeble-minded. This attitude toward mental tests is now rapidly disappearing, but it was a prejudice against which psychologists had to fight in their efforts to widen the scope of mental testing." [1]

The Appearance of Other Scales.—In 1911 Binet published a second revision of his scale, but his work was interrupted by death shortly afterward. However, his researches had been published all over the civilized world, and the stimulus which they gave to mental testing resulted in the construction of various other scales for measuring intelligence. Several of these are mentioned in passing.

The Yerkes, Bridges, and Hardwick test, first published in 1915, was a revision of the tests of Binet. Its chief feature, however, was the use of a new method of scoring—by points rather than by years of mental age. The following year the Stanford Revision of the Binet-Simon Scale was published, and, to a large extent since, mental testing in the United States has become synonymous with the use of this scale. It was the work of Lewis M. Terman and others, and took its name from Stanford University, where the work was done.

[1] PINTNER, *op. cit.*, p. 42.

While Terman's revision added nothing essentially new to the ideas of Binet, its publication marks, nevertheless, a distinct advance in intelligence measurement because it remedies various defects of the original Binet Scale more satisfactorily than does any other now available. It is standardized on a much larger number of children than the Binet Scale; it purports to measure intelligence to a higher age level; directions for giving the tests are carefully standardized; and, finally, the intelligence quotient is introduced as the expression of intellectual quality. This last-named concept will be discussed subsequently.

Mention should be made of the Pintner-Paterson Performance Scale, the first to use tests entirely different from those of Binet.[1] "None of the tests in the scale require a knowledge of language by the subject. In this respect also it is very different from the Binet, where directions are given orally and most of the responses are oral. The scale has been found useful in the testing of foreign children, deaf children, and also as a supplement to the Binet Scale."[2]

The most recent development in the field of mental testing has been the rise of the group test. "Here the subjects are examined in groups in contradistinction to the tests we have just described, in which the examiner is engaged with only one individual at a time. There is, of course, nothing intrinsically new in the group method, because it has been employed for a long time in psychological experiments. For the most part, however, these experiments were not directly concerned with getting an intelligence rating of the individual, and the new turn given to group tests at the present time is precisely the attempt to obtain a measure of the individual's mental ability."[3]

The entry of the United States into the World War, and the consequent utilization of intelligence tests for military purposes, accelerated tremendously the development of the group test. "When the psychologists in national service were

[1] PINTNER, R., and PATERSON, D. G., *A Scale of Performance Tests*, D. Appleton & Company, New York.

[2] PINTNER, *op. cit.*, p. 48.

[3] *Ibid.*, pp. 48-49.

confronted with the necessity of identifying the mentally deficient among the soldiers during the recent war, it was clear that an individual examination could not be given to each of the thousands of men who presented themselves for duty. In this situation group tests were devised, which could be given to many men at the same time. Those who fell far below the norms in these group tests were then selected for individual examination.

"The same method is applicable to school children, and in future we shall undoubtedly see group tests regularly in use as a preliminary means of identifying the subnormal."[1] It is especially an excellent telescopic method of getting a first survey of a situation. A number of such group tests are now available.[2]

Classifications of the Feeble-Minded.—In applying his tests to the inmates at Vineland, Goddard observed that practically all of them, with the exception of several delinquents of normal intelligence inadvertently committed there by the courts, showed a mental age below the twelve-year level. Thus somewhat naturally it came to be assumed that feeble-mindedness was a psychological condition which among mature persons never exceeded that limit. The somewhat awkward definition based on the earlier work with graded intelligence tests was substantially as follows: Children who show a mental retardation of two or more years, below and including the chronological age of nine years; and three or more years of mental retardation above the chronological age of nine years; and adults who grade at or below a mental age of twelve years, and who are not demented—are to be considered technically defective.[3] Similar was the definition proposed by Doll, to the effect that feeble-mindedness is "a condition of arrested development, specifically of the general intelligence, which limits the individual to mental capacity not exceeding that of twelve-year-old normal children."[4]

It was on the basis of this range that the oft-quoted dis-

[1] HOLLINGWORTH, *op. cit.*, pp. 69-70.
[2] PINTNER, *op. cit.*, Chap. VI.
[3] HOLLINGWORTH, *op. cit.*, p. 51.
[4] Quoted by PINTNER, *op. cit.*, p. 179.

tinction between idiots, imbeciles, and morons was made. According to this classification, tentatively adopted by the American Association for the Study of the Feeble-minded in 1910, those with a mental age of two years or less were grouped as idiots; imbeciles comprised the grade of feeble-mindedness ranging between three- and seven-year mental-age levels; while Goddard's term moron was applied to those whose age levels ranged between eight and twelve years. It is still customary in many circles to employ this mental-age grouping in defining the grades of mental deficiency.

This terminology differs in one respect from that used in Great Britain, where the term feeble-minded is restricted to indicate the moron type of the American classification. Another well-known American classification is that used by Barr, based fundamentally on the kind and amount of care needed: (1) Asylum care, including profound idiots, superficial idiots, and idio-imbeciles; (2) custodial life and perpetual guardianship, including moral imbeciles; (3) long apprenticeship and colony life under protection; and (4) the backward and mentally feeble, who may be trained for a place in the world.

The Use of the Intelligence Quotient.—With the increasing use of intelligence tests, it became expedient that some method of expressing the results, other than in terms of such labels as idiot, imbecile, and moron, be devised. This need was met by the introduction of the intelligence quotient, suggested by Stern and adopted by Terman in the Stanford Revision of 1916.

The intelligence quotient, commonly referred to as the I. Q., is the ratio of mental to chronological age. The mental age is divided by the chronological age and the quotient obtained is called the I. Q. Children testing at age will have I. Q.'s of 1.00; those below age or above age will have I. Q.'s greater or less than 1.00, respectively. All adults, regardless of age, are considered as of that chronological age decided upon as equivalent to average adult intelligence. Terman used sixteen years as the divisor for all adults, but others have placed it below that age.

Since 1916, the intelligence quotient has come into common use, and recently certain psychologists have employed it as a measure or definition of feeble-mindedness. "The result of the research of the past decade," says Hollingworth, "is that individuals who grade below 70 I. Q. are never found to be capable of satisfactory independent adjustment to school or to social environment. They cannot even approximate the performance of their fellows. Dr. Terman found that 2 per cent of his unselected school children graded at or below 73 I. Q. If we include in our estimate the idiots and very low-grade imbeciles who would have been found among 1,000 unselected children, (though not among 1,000 unselected school children), we should have about 2 per cent of mental defectives. This is what we should expect on the basis of all the known facts about individual differences. We should expect that about 2 per cent of all individuals belonging to our species would vary so far from the average as to be unfitted to meet the ordinary exigencies of life.

"We are now tending toward this definition: a feeble-minded person is one who has originally an intelligence quotient of 70 per cent or less, and whose status falls in the lowest 2 per cent of human intellect. . . . In terms of the I. Q., idiots grade roughly from 0 to 20, imbeciles from 20 to 40, and morons from 40 to 70."[1]

The Distribution of Intelligence.—If a large number of individuals, selected at random, are measured for any given trait, about half of them will fall within certain very narrow limits, while the remaining half will distribute themselves about equally on either side. Moreover, the farther we go from the confines of the middle 50 per cent in either direction, the fewer the individuals who fall there. This is spoken of as normal distribution. A normal distribution for intelligence, then, means that the majority of individuals possess a medium or average amount of it, that an equal number of individuals possess more or less of it, and that progress from the average to very little or very much

[1] HOLLINGWORTH, *op. cit.*, pp. 51-53.

intelligence is marked by a gradually decreasing number of individuals.

As has been pointed out, intelligence tests were confined largely at first to the feeble-minded. More recently, however, they have been given to other classes of the population. The development of group tests in particular facilitated such general application. From such intelligence ratings of unselected groups of people, it came to be seen that the distribution of individuals with reference to general intelligence approaches a normal distribution.

"In actual practice no set of tests gives a perfectly normal distribution, although almost all groups of tested individuals seem to approach such a distribution the better our sampling of individuals becomes and the better our set of tests is constructed. It may be that the actual distribution of intelligence is not perfectly normal, that it is skewed slightly to the upper or the lower end of the curve, but with the comparatively rough intelligence measures that we possess at present the best assumption for practical purposes is that of a normal distribution."[1]

The outstanding illustration, of course, is that of the army mental tests, given to 1,726,966 men. The summary of the results obtained, together with an explanation of the letter ratings employed, are quoted from the official report: "The rating a man earns furnishes a fairly reliable index of his ability to learn, to think quickly and accurately, to analyze a situation, to maintain a state of mental alertness, and to comprehend and follow instructions. The score is little influenced by schooling. Some of the highest records have been made by men who had not completed the eighth grade. The meaning of the letter ratings is as follows.

"A—Very superior intelligence. This grade is ordinarily earned by only 4 or 5 per cent of a draft quota. The 'A' group is composed of men of marked intellectuality. 'A' men are of high officer type when they are also endowed with leadership and other necessary qualities.

"B—Superior intelligence. 'B' intelligence is superior, but

[1] PINTNER, *op. cit.*, p. 72.

less exceptional, than that represented by 'A.' The rating 'B' is obtained by eight to ten soldiers out of a hundred. The group contains many men of the commissioned officer type and a large amount of non-commissioned officer material.

"C—High average intelligence. This group includes 15 to 18 per cent of all soldiers and contains a large amount of non-commissioned officer material, with occasionally a man whose leadership and power to command fit him for commissioned rank.

"C—Average intelligence. It includes about 25 per cent of soldiers. Excellent private type with a certain amount of fair non-commissioned officer material.

"C— —Low average intelligence. This group includes about 20 per cent. Although below average in intelligence, 'C—' men are usually good privates and satisfactory in work of a routine nature.

"D—Inferior intelligence. It includes about 15 per cent of soldiers. 'D' men are likely to be fair soldiers, but they are usually slow in learning and rarely go above the rank of private. They are short on initiative and so require more than the usual amount of supervision. Many of them are illiterate or foreign.

"D— and E—Very inferior intelligence. This group is divided into two classes: (1) 'D—' men, who are very inferior in intelligence but are considered fit for regular service; and (2) 'E' men, those whose mental inferiority justifies their recommendation for development battalion, special service organization, rejection, or discharge. The majority of D— and E men are below ten years in 'mental age.'"[1]

The results of the army mental tests, if plotted, show a curve of distribution skewed somewhat at the lower end—*i.e.*, the percentage of men of very inferior intelligence is higher than that of men of very superior intelligence. A number of factors undoubtedly are responsible for this, chief among them being the fact that the draft was highly selected at the upper end, since many men of superior intelligence became

[1] Yoakum, C. S., and Yerkes, R. M., *Army Mental Tests*, Henry Holt & Company, New York, 1920, pp. 22-23.

officers without being drafted or constituted the greater part of the group of professional and business experts that were exempted from the draft because essential to industrial activity in the war.

These results have been widely discussed and have become the occasion for many misgivings concerning the future of the American people.[1] Most of these discussions have been beside the mark and may be disregarded here.[2] The fact of normal distribution of intelligence is, however, a fact of considerable significance for social, economic, political, and pedagogical problems.[3] Its bearing upon the concept of feeble-mindedness, on the psychological side, will next be discussed.

Are the Feeble-Minded a Separate Species?—For a long time, and until quite recently, it was assumed as a matter of course that the feeble-minded were a very small and a very distinct group of individuals forming a somewhat distinct species, and differentiated from the normal by a marked divergence in their intellectual and emotional life. They were considered as beings apart, radically different from the rest of humanity. Evidences of this belief are scattered freely through the literature of the subject, as medical men, psychologists, and pedagogues sought the points of qualitative difference.

Dr. Norsworthy was the first to investigate the question by the method of experimental psychology, and her researches, published in 1906, definitely rejected this view. Binet, after prolonged psychological experimentation, arrived independently at the same conclusion, as did also Witmer at his work at the University of Pennsylvania. Says the latter; "I would not have it thought that the method of clinical psychology is limited necessarily to mentally and morally retarded children. These children are not, properly speaking, abnormal, nor is

[1] Cannon, Cornelia J., in *The Atlantic Monthly,* February, 1922, p. 145.

[2] Yerkes, R. M., in *The Atlantic Monthly,* March, 1923, p. 358. See also English, H. B., in *The Survey,* October 15, 1922, p. 79.

[3] Goddard, H. H., *Human Efficiency and Levels of Intelligence,* Princeton University Press, Princeton, 1920.

See also Lichtenberger, J. P., "The Social Significance of Mental Levels," *Publications of the American Sociological Society,* Vol. XV, The University of Chicago Press, Chicago, 1921, p. 102 ff.

the condition of many of them to be designated as in any way pathological. They deviate from the average of children only in being at a lower stage of individual development."[1]

It is evident from the data on the distribution of intelligence in the population at large that the feeble-minded differ from ordinary persons not in kind, but in degree, and that they form the lower end of the normal distribution curve. Two conclusions reached by Terman in connection with his study of a thousand unselected school children, previously referred to, may be quoted here:

"1. Since the frequency of the various grades of intelligence decreases gradually and at no point abruptly on either side of the median, it is evident that there is no definite dividing line between normality and genius. Psychologically, the mentally defective child does not belong to a distinct type, nor does the genius. There is no line of demarcation between either of these extremes and the so-called 'normal' child. . . .

"2. The common opinion that extreme deviations below the median are more frequent than extreme deviations above the median seems to have no foundation in fact. Among unselected school children, at least, for every child of any given degree of deficiency there is another child as far above the average I. Q. as the former is below."[2]

That the feeble-minded are the lower end of a normal distribution curve is supported further by the facts that, as accordance with such a curve would demand, there are more imbeciles than idiots, and more morons than imbeciles. Within the same species, the frequency decreases as individuals are removed farther and farther from the norm.

THE SOCIO-ECONOMIC CRITERION

Not all students of mental deficiency have agreed with the conception of feeble-mindedness presented thus far, with its emphasis upon general intelligence as opposed to specific abilities, and its fixation of a definite intellectual rating, be it

[1] Quoted from HOLLINGWORTH, *op. cit.*, p. 88.
[2] TERMAN, *op. cit.*, p. 67.

mental age or intelligence quotient, as the criterion of measurement or diagnosis. There have been those, and more recently their number seems to be increasing, who insist that society is interested primarily in the behavior and not the general intelligence of its members, and that in the actual disposition of cases of mental deficiency the test is one of social and economic fitness. This is the point which all of the earlier definitions of feeble-mindedness stressed, before the epidemic of mental testing. "The condition is a psychological one, although the criterion is a social one," says Tredgold.[1]

Among the exponents of the socio-economic criterion is Wallin, who has expressed himself recently on this point as follows: "We reaffirm the position we have emphasized again and again in print during almost a decade, that feeble-mindedness is fundamentally a socio-legal concept, being a condition of social and industrial incompetency or dependency due to defective intelligence dating from birth or from early life; that it cannot be diagnosed merely by intelligence tests (and even less by physical tests) except in obvious cases; that the large majority of the intelligence standards followed in the past, and the estimates made, have been unwarrantably high, as demonstrated by follow-up work with many cases; and that the fact that an individual possesses an intelligence level as high as ten years almost constitutes incontrovertible evidence that he is not feeble-minded, whatever else he may be."[2]

In comparing these two concepts of mental deficiency, it would appear that those students who have used the psychological criterion exclusively, and who have made their definition in terms of general intelligence levels, have assumed that an individual of such restricted mentality will be sure to fall below the required sociological standard. As a matter of fact, such an assumption is incorrect for the simple reason that social standards vary from place to place and from time

[1] Tredgold, *op. cit.*, p. 8.

[2] Wallin, J. E. W., "The Diagnostic Findings," *Journal of Delinquency*, California Bureau of Juvenile Research, May-July, 1923.

to time. "Varying social standards," says Pintner, "make it difficult to determine who is or is not able 'to maintain existence independently of external support.' Ability to adapt oneself to one's environment cannot be measured as accurately as general intelligence can be measured by means of a scale or tests. Therefore, the psychological criterion of feeble-mindedness by its objectivity and greater degree of exactness makes an appeal to the scientist which is lacking in the sociological criterion. The practical clinical psychologist must of course always take the sociological factors into consideration in his recommendations for commitment to an institution. For the protection of the individual and of society commitment or supervision is desirable for all those who are chronically unable to maintain themselves independently, and many of those may be above the limits of feeble-mindedness in the psychological sense of that term.

"We see, therefore, that the term 'feeble-mindedness' is ambiguous, because it has a distinctly social and a distinctly psychological meaning. There is a real need for two separate terms. 'Feeble-mindedness,' referring to those feeble in mind, might advantageously be restricted to all those who possess a certain limited amount of intelligence as measured by standard intelligence tests. Those who are unable to adjust adequately to the social environment might be termed 'socially feeble' and 'social feebleness' might be used as the substantive for this status."[1]

THE EXTENT OF FEEBLE-MINDEDNESS

In view of the lack of agreement as to what constitutes feeble-mindedness, as disclosed by the foregoing discussion, the impossibility of determining its extent is obvious. Not that estimates are lacking. Quite a few have been made in the last decade, but they show a wide divergence as either the psychological or socio-economic criterion of measurement has been applied.

How large a problem mental deficiency is depends entirely upon the definition of terms. If the problem be approached

[1] PINTNER, *op. cit.*, pp. 180-181.

with the psychological criterion in mind, and an I. Q. of 70 be accepted as the basis of definition, we have the estimates of Terman, Hollingworth, and others, that about 2 per cent of the population is mentally deficient. "Wherever intelligence tests have been made in any considerable number in the schools, they have shown that not far from 2 per cent of the children enrolled have a grade of intelligence which, however long they live, will never develop beyond the level which is normal to the average child of eleven or twelve years."[1] It is not without interest to add at this point that if an I. Q. of 70 be taken as the dividing line, or in the adult a mental age of slightly over eleven years, and this be applied to the results of the army mental tests, then 17.6 per cent of the drafted white men and 64 per cent of the colored drafted men were feeble-minded, inasmuch as that proportion registered below eleven years mental age in the tests.[2]

Over against such proportions are the earlier estimates, based more largely on the criterion of social fitness, and ranging from 300,000 to 600,000 for the United States. As far as institutional and other social programs to deal with mental deficiency are concerned, it is the test of social fitness which is applied. This makes the condition a relative matter. That such is actually the case is illustrated for example, in New York State, where commitments to the institutions for the feeble-minded from the cities of the state so far exceed those from rural districts as to be out of all proportion to the ratio of urban and rural population. One is reminded in this connection of the noted French physician who, in referring to a certain fellow-countryman whose home was in a rural province, exclaimed, "He is feeble-minded in Paris and normal at home." The upper limits of these estimates coincide with that recently reached by Dr. Pearce Bailey, chief of the Neuropsychiatric Division of the United States Army in the late war, who, on the basis of the experience of this Division, esti-

[1] TERMAN, *op. cit.*, p. 6.

[2] YERKES, R. M., "Psychological Examining in the U. S. Army," *Memoirs National Academy of Sciences*, 1921, Vol. XV., p. 790.

mates the total number of male defectives in the United States at approximately 350,000.

In summary, it may be said, then, that the number of mentally defective individuals in any population will depend upon the standard arbitrarily set up as to what constitutes mental deficiency.

THE SOCIAL SIGNIFICANCE OF MENTAL DEFICIENCY

The contrast and confusion between the psychological and socio-economic concepts of feeble-mindedness are evident again when we turn to a survey of its social significance, particularly in a comparison of earlier with more recent conclusions.

The Earlier Social Indictment.[1]—Prior to the opening of the twentieth century, the question of the social significance of mental deficiency received scant attention. The report of the British Royal Commission in 1908 was the first comprehensive study to reveal the close connection between mental deficiency and social inadequacy. In view of the fact that this commission made social competency the test of mental normality, it was entirely natural that it should find striking evidence of the relationship between feeble-mindedness and various social problems.

The idea of this relationship was taken up in the United States just about at the time Goddard introduced Binet's measuring scale and mental-age concept, and, in their application, identified feeble-mindedness with a less than twelve-year mentality. What happened, apparently, in the flush of the discovery of all these new ideas was their combination. Mental tests were given to prison and reformatory inmates, prostitutes, unmarried mothers, inebriates, paupers, and other social debtor classes, with the result that a generous proportion, testing at or below the twelve-year level, were pronounced feeble-minded, with the assumption promptly following that their low intelligence was the cause of their social inadequacy. It never suggested itself, in those halcyon days, to test the

[1] DAVIES, *op. cit.*, Chaps. IV, V, and XII.

intelligence of an equal number of persons out of jail, for instance, for purposes of comparison.

Alarm concerning the social consequences of mental deficiency soon became country-wide. There was general agreement that feeble-mindedness "is the mother of crime, pauperism, and degeneracy." "The social and economic burdens of uncomplicated feeble-mindedness are only too well known," declared one of the most eminent authorities of the time. "The feeble-minded are a parasitic, predatory class, never capable of self-support or of managing their own affairs. . . . They cause unutterable sorrow at home and are a menace and danger to the community. Feeble-minded women are almost invariably immoral, and if at large usually become carriers of venereal disease or give birth to children who are as defective as themselves. . . . Every feeble-minded person, especially the high-grade imbecile, is a potential criminal, needing only the proper environment and opportunity for the development and expression of his criminal tendencies."[1] And this indictment was extended to apply to all those who showed an intelligence level of less than twelve years, according to the newly-devised test.

By 1915 mental deficiency had focused public attention as perhaps the largest and most serious social problem of the time. The many articles, pamphlets, and official reports which appeared, the various commissions, agencies, and committees that were organized to cope with the problem, were evidences of this. There was widespread alarm. A number of states, including New York, Pennsylvania, New Jersey, Massachusetts, Indiana, Ohio, Minnesota, Kansas, Virginia, and Michigan, appointed official investigating commissions to make a survey of the problem and recommend what action should be taken.[2]

This overemphasis of the menace of social deficiency, for so it is now recognized to have been, was the result, then,

[1] Fernald, W. E., "The Burden of Feeble-mindedness," reprinted from the *Medical Communications of the Mass. Medical Society*. Vol. XXIII, p. 3.

[2] Davies, *op. cit.*, p. 58.

of a confusion between the psychological and socio-economic concepts or criteria. The indictment of these unfortunates began with the application of the test of social fitness, and when their identification was made on a psychological basis of a twelve-year intelligence level, it was entirely natural that there should have been genuine and widespread alarm.

The Present Attitude.—The bill of indictment of ten years ago has been redrawn. We are now told that the feeble-minded are of all sorts, some well-behaved, some the reverse. The present emphasis seems to be that what results from defective intelligence depends to a large extent upon the environmental stimuli. "The feeble-minded, or those low grades of intelligence with whom we have been dealing," says Davies, "for example, will reflect more closely than any other element of the population the kind of social leadership which directs them. They are almost entirely dependent upon leadership, and some kind of leadership they will find. Many will doubtless find the wrong kind and become a social and political detriment, unless they are afforded a strong leadership of the right kind. On the other hand, the feeble-minded may be expected to be among the most faithful followers of a protocracy if the protocracy sufficiently recognizes their special need for social guidance."[1]

Considerable attention is now being given to the fact that intelligence of the level or levels identified with feeble-mindedness is not much more prevalent in socially pathological groups than in the normal population, and accordingly the social significance of feeble-mindedness has been greatly minimized in certain quarters. Here again it seems that there is a confusion of concept. Those minimizing the social significance of mental deficiency are thinking about persons with I. Q.'s of 70 or less. Thus conceived, it is entirely natural to find that "the feeble-minded, who have come to public attention and have actually been known and classified as such, doubtless constitute but a small fraction of the large number of persons with equally low intelligence who perform

[1] DAVIES, *op. cit.*, p. 205.

their tasks steadily day in and day out, lead uneventful lives, and live decently and happily in their own limited ways." [1]

THE DIAGNOSTIC FINDINGS

An effort has been made in this chapter thus far to sketch the development of thought during the last twenty years in regard to mental deficiency and its social consequences. However inadequately this may have been done, enough has been said to make clear the lack of definiteness or agreement in regard to the nature of this factor. Since most of the difficulties have arisen presumably from a too ready reliance upon the diagnostic value of general intelligence measurements, it seems expedient at this point to raise certain questions pertaining to the essential point at issue.

1. *Do the Tests Measure Intelligence?* Thus far, the term "general intelligence" has been used continually without any attempt to define its meaning. This has been not unlike the practice of some psychologists, who have assumed that general intelligence exists, and have gone about its measurement on the basis of some rough working hypothesis, without waiting for an adequate definition. Many definitions of general intelligence have been proposed. Most of them, however, are restatements of those advanced by Stern. "Intelligence," he says, "is a general capacity of an individual consciously to adjust his thinking to new requirements." Again, "It is general mental adaptability to new problems and conditions of life." Or, again, "General intelligence is the ability of the organism to adjust itself adequately to new situations." [2]

Do the intelligence tests measure this general ability? That they measure something, and presumably of some importance, is for the most part unquestioned, but as to the exact nature of that which is revealed, there is considerable disagreement. There is the contention, for example, that the only time one could measure pure intelligence would be at birth. Each year,

[1] DAVIES, *op. cit.*, p. 204.
[2] PINTNER, *op. cit.*, p. 55.

thereafter, intelligence is more and more entangled with the skeins of experience. The difficulty of measuring intelligence in the higher age levels is recognized frankly; why is its exactness (even to the month-fraction of a year level) assumed so dogmatically for the earlier years? "Intelligence at any one time," says Mateer, "is a product value, and many factors enter into it. It involves every experience of the individual to date: his physical handicaps, his environment, heredity, earlier education, especially in habits of thought; his emotional life, particularly his attitude toward himself as an individual and as a part of the group. No two individuals can be found, no matter where we search, for whom all things in life have been equal. To measure a group of fifty on general intelligence, therefore, means measuring fifty sources of absolute variability."[1]

It is interesting to note in passing that in the army mental tests the native whites from the Northern states averaged considerably higher than the native whites from the South. If the difference in opportunities for earlier education be ignored, one is somewhat at a loss to interpret such a fact, unless, as some cynic has observed, it means that the intelligence of Northern whites has been enriched by immigration from southern Europe.

Reference to immigration suggests another factor. "The dearth of intelligence tests that are independent of the language factor indicates the magnitude of the problem that faces American investigators who wish to test the intelligence of individuals who have not had adequate training in English, immigrants, children of non-English-speaking parents, etc. It is possible to find many tests for older persons that do not involve language, but a great many of these tests do not involve intelligence. With younger children and lower-grade cases, the influence of language may appear in the instructions rather than in the test itself. . . . The problem of testing individuals without adequate training in English has con-

[1] Mateer, Florence, *The Unstable Child*, D. Appleton & Company, New York, 1924, p. 20.

siderable practical importance in this country with its cosmopolitan population."[1]

2. *Is General Intelligence the Sole Criterion?*[2] It has been a current assumption that feeble-mindedness is simply a low degree of general intelligence. Stress is laid upon general development as opposed to specific abilities. One reason for this undoubtedly is a somewhat natural inclination to develop a concept that is accurate and concise. Another may be the fact that so many of our earlier ideas about the mentally defective came from those persons who were connected with institutions for the feeble-minded or who had had a good deal of institutional experience.

"Working outside of institutions and with individuals who are not primarily selected according to mental traits," says Healy, "we discover a much greater complexity in the question of mental defect than is set forth in textbooks on the subject. Authors have developed their conceptions from observations in institutions, and have little or nothing to say about the border-line cases and those in which there are special and peculiar arrangements of mental capabilities and disabilities. Yet these are of the greatest interest for the student of delinquency, because they frequently are more troublesome socially, and because they offer far more hope in the way of adjustment by educational and vocational means than do typical forms of general feeble-mindedness."[3]

Healy contends that he cannot make diagnoses on the basis of tests for general intelligence alone because "(a) there are some who cannot pass the twelve-year tests, partly on account of poor native ability and partly because of lack of schooling, who yet get along normally in some humble sphere, and (b) because there are individuals with various defects who are

[1] Brigham, Carl C., "Two Studies in Mental Tests," *Psychological Review Publications*, The Psychological Review Company, Princeton, N. J., 1917, p. 235.

[2] See in this connection Hollingworth, *op. cit.*, Chap. VII, also Bronner, Augusta F., *The Psychology of Special Abilities and Disabilities*, Little, Brown & Company, Boston, 1917.

[3] Healy, William, *The Individual Delinquent*, Little, Brown & Company, Boston, 1915, p. 448.

able to pass the twelve-year tests, but who on account of their defects are unable to compete fairly with their fellows. Our experience leads us to feel certain that we have the most practical reasons for extending and subdividing the classification of mental defectives according to the possession of certain mental qualifications which have special social bearing, as well as according to the findings by intelligence tests, including the Binet system."[1]

In the reclassification which he (Healy) proposed in *The Individual Delinquent,* he accepted the differentiation of the lower grades of the feeble-minded into idiots and imbeciles, but the high grade, generally referred to as the moron, he subdivided into three main groups: Group A consists of those defective nearly on a general level—the typical case; Group B includes those having special abilities which, unless exploited under supervision, do not, as a rule, make for social success; and Group C, comprising those rather interesting cases where along with definite defect is some special ability, such as good insight into own defect, language facility or motor ability, making apparently and sometimes actually for social success. Beyond this refinement of the conventional moron type he extends his classification of defectives to include several varieties which, while ranging above the accepted mental age limits of feeble-mindedness, yet unquestionably show incapacities or particular defects of grave social significance.[2]

3. *Are Intelligence and Ability to Get Along Synonymous?* Do intelligence ratings indicate the ability of the individual to hold down a job, to mix with people—in other words, to get along in the world? Such would seem to have been the general assumption.

How and why this assumption came to be made becomes apparent if the history of mental testing in the United States be recalled. In the first stage of their development, intelligence tests were applied chiefly to the feeble-minded in institutions. It being found that they rated at low age levels, this

[1] Healy, *op. cit.,* p. 450.
[2] *Ibid.,* pp. 447-546.

fact was taken to mean that such a rating was a fair, and then somewhat later the sole, index to their ability to meet the requirements of life outside of the institution. Subsequently, mental testing came to be applied largely to school children, and here again ability to do the tests and ability to succeed in the classroom largely coincided. The result was inevitable. Equal weight and equal reliance were accorded by many to the results of the tests in judging ability to get along in society at large. Feeble-mindedness, thus, was diagnosed by intelligence measurement, since intelligence, as revealed by the tests and the ability to get along, were synonymous.

Now that the pioneering enthusiasm in mental testing is passing, saner judgments in the diagnostic value of intelligence measurement prevail. The requirements of society at large differ from those of such artificial environments as the institution and the classroom. "Placing sole reliance in the fact of mental age for the understanding of the mental defective may be compared somewhat to the classical economics which based its theories on the so-called 'economic man.' Just as the economic motive is one, but only one, of many motives that may actuate the individual, so the degree of native intelligence is one element but only one of many elements that go to explain the behavior of the feeble-minded."[1]

"Perhaps the best indication of the psychological pulse may be found in the studies reported each year at the annual meeting of the American Psychological Association. Reviewing these for the last three years is most enlightening. There are no unqualified claims for test validity, no spectacular reports of age-old problems solved by the study of one aspect such as mental age. Instead, we find Gesell reports a boy with a seven-year mentality earning his living. Doll reports the mental age of successful army recruits as far below anything we had estimated. Bronner reports great variability of scores by the same child on various tests. We could enumerate indefinitely, but the illustrations given suffice. They mean that we have entered into a more rational period of critical testing.

[1] DAVIES, *op. cit.*, p. 186.

Attention is being focused more upon methodology and upon the validity of the findings in individual cases. More and more of our workers are coming to see the need for completeness in detail and breadth of vision in clinical work."[1]

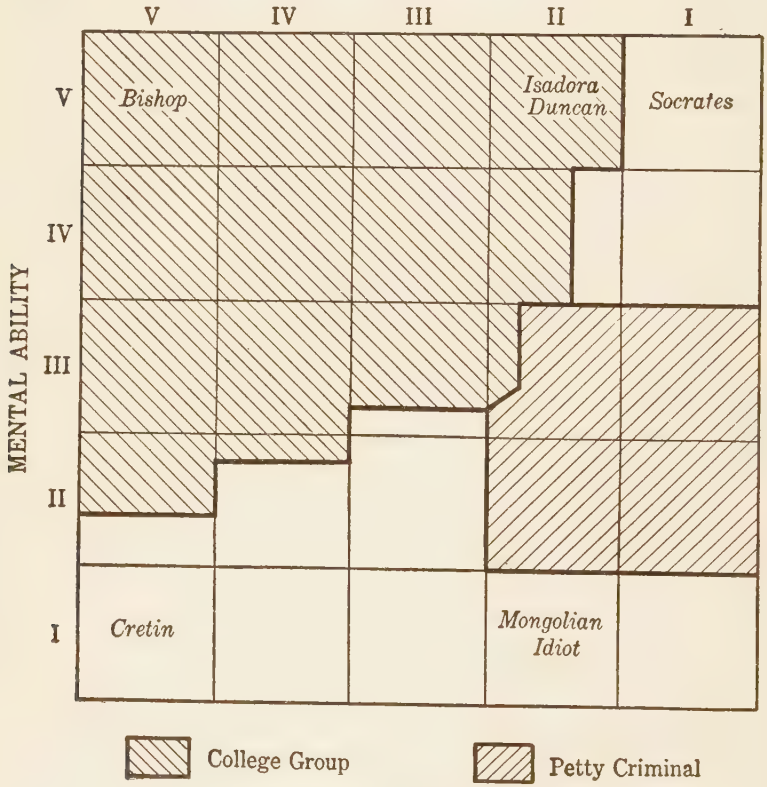
THE DISCOVERY OF PERSONALITY DIFFERENCES

Two facts stand out clearly above the turmoil of recent discussions, criminations, and recriminations, and they are: (1) that individual diagnosis is the key to the identification of the feeble-minded, and (2) that "it is a matter not of one characteristic or a group of characteristics, but of the whole personality make-up of the individual. Native intelligence is only one of a number of elements that go to make up the whole personality. Within certain limitations of mental age, it is to be doubted whether it is the most important factor in the conduct of the mental defective. What is known as 'good common sense,' for example, is an element that does not appear to be closely correlated with mental age. It varies apparently among the feeble-minded of the same mental age, just as it does among normal people. As a matter of fact, some of the feeble-minded whom the institutions are trying to rehabilitate and who are of quite high-grade, or even border-line, intelligence, fail in the community for lack of this quality, while others of the same mentality succeed because they happen to have it.

"The same may be said of the innumerable other factors that enter into the personality of the mental defective which do not register in the measuring scale of native intelligence—such things as emotional stability, temperament, disposition, aptitude, teachability, sociability, etc. Psychologists, psychiatrists, social workers, and others who are specializing in this field are becoming increasingly aware of this problem and already several outlines of the qualities that should be considered in order to get a picture of the whole personality have been devised."[2] Two of these will be mentioned here.

[1] MATEER, *op. cit.*, pp. 31-32.
[2] DAVIES, *op. cit.*, pp. 186-187.

Witmer's Outline.[1]—Dr. Lightner Witmer, of the University of Pennsylvania, who established in 1896 the first psychological clinic in the United States, who introduced the term "clinical psychology" into the literature of psychology and education,[2] who has been its undeviating exponent, and who has consistently contended that "no Binet-Simon tests, or any other tests, will inform us as to what we shall consider feeble-minded,[3] analyzes the situation into two factors—mental



[1] I am indebted, for the following chart and outline of Dr. Witmer's views, to Professor Samuel Fernberger, of the Department of Psychology, University of Pennsylvania.

[2] WITMER, L., "Psychological Diagnosis and the Psychonomic Orientation of Analytic Science," *The Psychological Clinic,* Philadelphia, January-February, 1925, pp. 1-18.

[3] *Ibid.,* "Children with Mental Defect Distinguished from Mentally Defective Children," December, 1913.

ability and social conformity. These relations may be explained by reference to the preceding chart.

The degrees of social conformity are laid off along the horizontal dimension and the degrees of mental ability in the vertical. Each row and column is assumed to be in the form of a normal distribution curve and so the whole figure assumes the shape of a tridimentionally curved solid figure. In other words, the figure represents a composite of normal curves of distribution, which corresponds to the observed facts for both mental ability and for social conformity. Both dimensions, for purposes of convenience, have been divided into five divisions, V being the greatest degree and I the least of either quality. Inasmuch as these are representations of distribution curves of normal distributions, the number of individuals represented in each of the five divisions varies considerably. All edges (columns or rows I and V) contain relatively few individuals and column and row III contain the largest number of individuals.

According to Witmer's view, mental ability and social conformity are independent variables. A bishop and Socrates both have the highest degree of mental ability and so both will be found in the upper row of the figure. The bishop will also have the highest degree of social conformity and so will be placed in the square V-V. But Socrates was made to drink the hemlock by the people of his community and so he must be placed in square V-I. The conservatives will all be found on the left side of the figure and the radicals in the right. The same sort of differentiation will be found at the lower end of the scale of mental ability. The cretin has the lowest degree of mental ability but a high degree of conformity, and so will be placed in square I-V. On the other hand, the mongolian idiot has no more mental ability but has much less conformity, and he will be found in square I-II.

The college group are to be found over a large area tending toward the upper left-hand corner of the figure. Too little mental ability or too little conformity may be the cause of failure in college. On the other hand, and this the shaded portion of the figure clearly shows, the less the degree of men-

tal ability the greater the degree of conformity for success in college life. The group which recruit the petty criminal are to be found in the lower right-hand corner of the figure—a group with a low degree of mental ability and also with a low degree of social conformity. Given their degree of social conformity with a higher degree of mental ability, they would rise above the class of the petty criminal at least. This area has not been carried down into the lowest degree of mental ability, as practically all individuals in this class are considered as needing institutional care.

One corollary is perfectly obvious, however. Those individuals in the community who are responsible for social progress are to be found toward the upper right-hand corner of the figure—a position representing a high degree of mental ability with a less than average degree of social conformity.

The Proteus Social Ratings Scale.—The fact that the whole personality of the individual rather than simply the mental capacity must be recognized, together with a suggestive outline for the rating of personality, is to be found in *A Study of Personality of Defectives with a Social Ratings Scale,* published in 1920 by Dr. S. D. Porteus, director of the department of research of the Vineland Training School. The fundamental point of view underlying the development of this scale can be gathered from these words: "The whole difficulty of the task of test interpretation lies in the fact that behind so-called 'mental age' stands the personality of the individual. The psychiatrist is right in his emphasis on the fact that right social adjustment depends upon the whole individual make-up, rather than the mentality. A writer in a recent medical journal complained that his fellow physicians treated the patient only below the eyebrows. With equal truth it may be said that the psychologist too often tends to observe the patient only above the eyebrows. Unfortunately, the psychiatrist, while he would delimit the work of the practicing psychologist to psychometry—a mental measuring without interpretation—is rarely able to interpret the tests himself, yet, at the same time, cannot disregard their verdict. For all practical purposes it is just as unreasonable to consider

personality as unaffected by intelligence as to consider intelligence apart from personality. The most direct way of determining the question of social fitness is to study intelligence and personality in social relations."[1]

Dr. Porteus then goes on to explain the basis on which he has worked out a social ratings scale for defectives, emphasizing the other qualities, in addition to general intelligence, which affect social adaptation. "The community into which an individual must fit is," he says, "first of all, a working community, hence one of the first things to be determined is the working capacity. Under institutional conditions this may be done by a form of industrial scale. . . . In the next place, it is to a greater or less extent an intelligent working community, so there must be a certain modicum of learning capacity to enable the individual to profit by training and to assimilate ideas. Earning and learning capacity are then closely related to self-support. But even with the ability for self-support, the individual is not fit for the community unless he has also some capacity for self-management and self-control. In other words, he must have the ability to manage himself and his affairs with ordinary prudence. This capacity for self-management depends mainly upon temperament and disposition, judgment and common sense, while self-control must be exhibited in the inhibition of unsocial, instructive, and impulsive action. The factors affecting social fitness may be conveniently displayed in the following scheme. These factors are, of course, closely related and interact in varying degrees.

Social Fitness	1. Earning capacity 2. Learning capacity	Self-support
	3. Temperament and disposition 4. Judgment and common sense	Self-management
	5. Inhibition of anti-social instincts and impulses	Self-control[2]

[1] Porteus, S. D., "A Study of Personality of Defectives with a Social Ratings Scale," *Publications of the Training School at Vineland, New Jersey*, No. 23, December, 1920, p. 5.

[2] *Ibid.*, pp. 5-6.

Whatever may be said about such a scale, by way of either criticism or indorsement, it shows how, even on the basis of the institutional experience of which it was compiled, many other factors in addition to mental age must be taken into consideration for the understanding of the personality of the individual.

Types of Personality Studies.—There are many studies of personality, other than those to which reference has been made. Kimball Young,[1] in summarizing the recent personality studies, indicates the persistence of two main trends or types of investigation. One of these is structural, or cross-sectional, viewing personality as a combination of given traits which may be studied statistically. The other is historico-genetic, or functional, viewing personality from the angle of its genesis and with particular reference to its social setting. An adequate workable synthesis of these two contrasted methods has not yet been made.

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[1] "Personality Studies. Topical Summaries of Current Literature," *Amer. Journal of Sociology,* Vol. XXXIII, No. 6, pp. 953-971, May, 1927.

CHAPTER XXII

THE CAUSES OF MENTAL DEFICIENCY

What causes mental deficiency? This question has been given extensive consideration in the last quarter of a century. It is the purpose of this chapter to review the several factors emphasized in the past, and to attempt somewhat of an appraisal of the existing data bearing upon the problem.

EARLIER EMPHASIS UPON ENVIRONMENTAL FACTORS

Prior to the twentieth century, mental deficiency was attributed in most cases to some adverse condition in the environment of the individual, such as a fall or sickness during childhood, injuries at birth, or mishaps to the mother during pregnancy. Heredity was recognized as an etiological factor, in a general way, but it was regarded as one of many factors and not of predominating importance.

It is not surprising that the earlier students of mental deficiency should have attached primary importance to the environmental factors in its causation. Such a conclusion accorded with views of life in general which, until recently, were commonly accepted. "From the earliest times it has been believed that species might be transmuted by environmental changes and that even life itself might arise from lifeless matter through the influence of favorable extrinsic conditions. If environment could exert so great an influence on the origin of species or even of life itself, much more could it affect the process of development of the individual. It is still popularly supposed that complexion is dependent upon the intensity of light, and stature upon the quantity and quality of food, that sex is determined by food or temperature, mentality by education, and that in general individual peculiarities are due to environmental differences.

"Many philosophers of the seventeenth and eighteenth

centuries taught that man was the product of environment and education and that all men were born equal and later became unequal through unequal opportunities. . . . The Declaration of Independence merely reflected the spirit of the age in which it was written when it held this truth to be self-evident, 'that all men are created equal.' The equality of man has always been one of the foundation stones of democracy. Upon this belief in the natural equality of all men were founded systems of theology, education, and government which hold the field to this day. Upon the belief that men are made by their environment and training rather than by heredity are founded most of our social institutions with their commands and prohibitions, their rewards and punishments, their charities and corrections, their care for the education and environment of the individual, and their disregard of the inheritance of the race."[1]

Furthermore, the data most readily accessible were all in support of such an explanation of the origin of mental defect. Some adverse environmental conditions can be found in the life of any individual. What person is there who escapes *in toto* the falls and diseases of childhood? Many mothers undergo some untoward experience during pregnancy. Not all deliveries of babies are easy and simple. Facts such as these are much easier to elicit than the details of family history, often most zealously guarded. And when the information which the families concerned were most willing to give supported the current assumption, what incentive was there to search for other explanations?

PIONEER FAMILY STUDIES

The first real challenge to this emphasis upon environmental factors came in the last quarter of the nineteenth century with the appearance of several historical studies of conspicuously undesirable family strains. Of these, the one which attracted most widespread attention, as well as the first to appear, was that of the so-called Juke family, pub-

[1] Conklin, Edwin G., *Heredity and Environment*, Princeton University Press, Princeton, 1923, fifth edition revised, pp. 214-215.

lished in 1877. This study was made by R. L. Dugdale, an active worker in prison reform in New York, who, in the course of his investigations of the penal institutions of that state, was impressed by the recurrence of the same family name among the inmates of certain prisons. His interest thus aroused, he determined to investigate the family connections of these individuals, with the result that he discovered a large number of people who were related and who could be traced back to a family of six sisters, born between the years 1740 and 1770. The progeny of five of these sisters (one moved out of the country) was traced by Dugdale through five generations. There were 709 individuals included in this study, of whom 540 were of Juke blood and 169 were of "X" blood connected by marriage or cohabitation. Of these 709, there were 180 who had either received poorhouse care or outdoor relief aggregating 800 years. Among the social offenders were listed 140 criminals and other lawbreakers, 60 habitual thieves, 50 common prostitutes, 7 murderers, and 40 women venereally diseased. Dugdale estimated that the total cost to the state resulting from the social failures of this stock over a period of seventy-five years amounted to $1,308,000.[1]

Dugdale's thesis was that certain forms of behavior—criminal tendencies and pauperism—are hereditary; that undesirable traits are "bred in the bone." Although he refers to some of these people as "idiotic" and "weak-minded," it is obvious from the date of publication that he had no clear ideas as to their mental status or its possible relationship to their behavior.

A study similar to that of the Jukes, and inspired by Dugdale's work, was made by the Rev. O. C. McCullough in Indiana and published in 1888 under the title, *The Tribe of Ishmael.* This furnished further evidence in support of the rôle of heredity in perpetuating degenerate stocks.

In 1892 Charles Booth published his studies of pauperism in London. From the basis of records of the relieving officers of various poor-law unions in London, he cites a number of stories of cases which had been relieved during a period of

[1] DUGDALE, R. L., *The Jukes,* G. P. Putnam's Sons, New York, 1877.

years. Story after story in this study shows how the tendency to laziness, immorality, irregular employment, drunkenness, and sickness, with their resulting recourse to the public poor-relief authorities, run in certain families. Incapacity runs like a thread, says one commentator, from father to son or daughter and on down the line.[1]

The conclusions of these earlier studies are vitiated, of course, by the assumption that pauperism and crime are inherited as such. But their appearance, at a time when the environmental factors were considered as of almost exclusive importance in the development of the individual, brought out the fact most strikingly that in these particular families, at least, certain conditions socially undesirable recurred entirely too frequently to be explained on any other basis than the transmission of some hereditary defect or defects. Of the nature of these defects, or of the principles governing their transmission, little was then known. Further progress in this direction awaited advances in related fields. Fortunately these were destined to appear shortly.

REVELATIONS OF THE NEW CENTURY

The first decade of the twentieth century witnessed two developments whose importance in this connection can hardly be overestimated. One of these was the public awakening to mental deficiency as a social problem of the first magnitude, alluded to in the preceding chapter. As pointed out therein, the outstanding factors in that development were the report of the British Royal Commission, the appearance of the Binet-Simon Intelligence Scale, and its application to the identification of mental defectives.

Parallel with this was a similar awakening of interest in the scientific study of heredity. In 1900, DeVries, Correns, and Tschermark, by independent investigations, resurrected and verified the Mendelian laws of heredity. The following year, 1901, appeared Galton's paper on the "Possible Improvement of the Human Breed." This, together with his

[1] Booth, Charles, *Pauperism and the Endowment of Old Age*, See, for example, his story of the now famous Rooney family, pp. 14-15.

paper on "Eugenics: Its Definition, Scope and Aims," read in 1904 to the English Sociological Society, are usually thought of as formally launching the modern eugenics movement. The first of these new interests stimulated tremendously the study of the causes of mental deficiency, the second dominated and dictated the course of its development for a number of years. Together they are responsible for the various studies emphasizing the importance of the hereditary factors in mental deficiency made since that time.

STUDIES IN THE HEREDITY OF MENTAL DEFICIENCY

Just as Goddard was a pioneer in the application of the newly devised measuring scale of intelligence to the identification and classification of mental deficiency, so he was among the first to approach the study of its causation in the light of the newer developments in the field of heredity. His investigations of the family histories of inmates admitted to Vineland afford the most extensive data available in support of the heredity of feeble-mindedness. His two books, *The Kallikak Family,* and *Feeble-mindedness: Its Causes and Consequences,* are probably the best known and most widely read books on the subject.

The former publication resulted from the effort to trace the ancestry of a feeble-minded girl, Deborah, who had become an inmate at Vineland. Deborah had been born in an almshouse. Her mother, too, was feeble-minded, and had had several other children by various other men. Miss E. S. Kite, the field worker, ultimately worked out the genealogy of the Kallikak family, back through five generations to the offspring of an illegal union between Martin Kallikak, a soldier in the Revolutionary army, and a presumably feeble-minded girl whom he met at a tavern. Martin Kallikak, Jr., the son of this union, left numerous descendants, of whom 480 were traced. Of these, 143 were proved conclusively to be feeble-minded, according to Goddard, while only 46 were found to be normal. The rest were unknown or doubtful. In terms of social behavior, 36 were illegitimate children; 33 were sexually immoral, mostly prostitutes; 24 were confirmed alco-

holics; 3 were criminals; and 8 kept houses of ill fame. The Kallikaks married into other families, for the most part of their own type. Inclusive of these, 1,146 individuals were obtained. Of this large number, 262 were declared by Goddard to be feeble-minded, 197 were considered normal, while the remaining 581 were still undetermined.[1]

Later, Martin Kallikak, Sr., married a normal woman of good family and raised several children. These legitimate children of Martin, Sr., married into the best families in their state, the descendants of Colonial governors, signers of the Declaration of Independence, and even the founders of a great university. Indeed, in this family and its collateral branches we find nothing but representative citizens—doctors, lawyers, educators, landholders, men and women prominent in every phase of social life. There have been among the 496 direct descendants through the legitimate line, no illegitimate children, no immoral women, no feeble-minded, only three somewhat degenerate men among them.[2]

In *Feeble-mindedness: Its Causes and Consequences,* Dr. Goddard gives the results obtained from a study of 327 institutional cases at Vineland. There was no selection in the cases studied. In 27 of them there was not sufficient data to warrant any conclusions, so that the summary includes the remaining 300 cases. Of these, Goddard concluded that 164, or 54 per cent, showed other feeble-minded persons in the family history in such number and relation to the case as to leave no doubt as to the hereditary character of the mental defect.[3] "In these cases," he says, "it is evident from the charts themselves that we are dealing with a condition of mind or brain which is transmitted as regularly and surely as color of hair or eyes."[4] An additional 34, or 11.3 per cent, of the cases were regarded as probably hereditary, so that the hereditary group constitute 65 per cent of the total. In still another 12 per cent of the cases, heredity was found in the form of

[1] Goddard, H. H., *The Kallikak Family,* The Macmillan Company, New York, 1912.

[2] *Ibid.,* pp. 29-30.

[3] Goddard, H. H., *Feeble-mindedness: Its Causes and Consequences,* The Macmillan Company, New York, 1914, p. 437.

[4] *Ibid.,* p. 437.

neuropathic ancestry, with the forbears suffering from such maladies as paralysis, apoplexy, epilepsy, insanity, or various neurotic conditions. Accidental cases numbered 57, or 19 per cent of the cases, while the remaining 8 cases, or 2.6 per cent, showed no definite assignable causes.[1]

Other studies of mental defect in families followed in rapid succession. They include *The Nam Family,* by Arthur H. Estabrook, 1912; *The Hill Folk,* by Davenport and Danielson, 1912; *The Pineys,* by Elizabeth Kite, 1913; *The Jukes in 1915,* by Arthur H. Estabrook, 1915; *The Family of Sam Sixty,* by Mary S. Kostir, 1916; and others. It is hardly necessary to consider these in detail, since they show little but a monotonous repetition of the same history of undesirable behavior.

Brief reference might be made to Estabrook's continuation of the history of the Juke family. The interval between Dugdale's time and Estabrook's study witnessed a rapid increase in the Juke family, with little or no improvement in its general character. Estabrook's investigation covered 2,094 persons, of whom 1,258 were living in 1915. Of the whole family up to 1915, considering only those of Juke blood, 170 were paupers, 129 had received outdoor relief, 118 were criminals, 378 were prostitutes, 86 kept brothels, and 181 were intemperate. The cost of this family to the communities wherein they resided was placed by Estabrook at $2,516,685, aside from the trouble and contamination of which they have been the source.

As twentieth-century readers of Dugdale's study would suppose, Estabrook identified many of the Jukes as feeble-minded. In general, he concludes, one-half of the Jukes were and are feeble-minded, while in every case in which he was able to study Juke criminals, he concluded that without doubt the individual was feeble-minded. "Not all feeble-minded Jukes are criminal, but all the Juke criminals that I have known I regard as mentally defective."[2]

[1] Goddard, *op. cit.,* p. 437.

[2] Estabrook, Arthur H., *The Jukes in 1915,* Carnegie Institution of Washington, 1916.

APPLICATION OF THE MENDELIAN FORMULA

In 1910 Goddard read a paper before the American Breeders' Association in which he presented charts showing the family histories of a number of inmates at Vineland, and called attention to the presence of mental defect in successive generations. These charts were presented at the time without comment or conclusion, although they strongly suggested the transmission of this defect in typical Mendelian manner. Subsequently, Dr. Charles B. Davenport, in commenting on this study, concluded that mental deficiency was transmitted in terms of the Mendelian formula. This was the first definite statement of Mendel's law in the heredity of mental defect.

In *Feeble-mindedness: Its Causes and Consequences,* Goddard accepts this application. "Since our figures agree so closely with Mendelian expectation," he says, "and since there are few, if any, cases where the Mendelian formula does not fit the facts, the hypothesis seems to stand: *viz.,* normal-mindedness is, or at least behaves like, a unit character; is dominant and is transmitted in accordance with the Mendelian law of inheritance." [1] "It is clear from the data already presented that feeble-mindedness is hereditary in a large percentage of the cases, and that it is transmitted in accordance with the Mendelian formula." [2]

CONCLUSIONS FROM ABROAD

Meanwhile, foreign students had reached a similar conclusion as to the supreme importance of hereditary factors in the etiology of mental deficiency. Tredgold, the well-known British authority, placed the proportion of cases in which heredity plays a rôle at close to 90 per cent. His conclusions are all the more significant because he began his work with the belief that the majority of cases were due primarily to adverse environmental conditions. "It was only when I found how frequently morbid inheritance lay behind," he says,

[1] GODDARD, *Feeble-mindedness, op. cit.,* p. 556.
[2] *Ibid.,* p. 560.

"that I came to a different conclusion," [1] and it is to the relative completeness of his inquiry into the family histories, as over against the superficial data in institutional records, that he attributes the fact that his estimate of the importance of heredity exceeds those of other English authorities.

In stating Tredgold's conclusions as to the proportion of cases in which heredity is a factor, it is necessary to add somewhat of a qualification by way of his explanation of the nature of the germinal variation. "The conclusion to which I have come," he says, "is that amentia must usually be regarded as due to a diminished potentiality for development in that constituent of the germ plasm which determines the development of the central nervous system—the neuron determinant. In many cases the change may be more widespread, and then other tissues of the body are also affected, producing what are known as 'stigmata of degeneracy.' In other words, the inheritance in amentia takes the form of a neuropathic diathesis, or an innate predisposition to neuronic imperfection." [2]

In the determination of the results of this neuropathic diathesis, he recognizes the importance of environmental factors. "I am disposed to think," he says, "that one of the commonest of these factors is the physical condition of the mother during gestation. Obviously this is a matter upon which it is difficult to obtain precise information; but I have been struck by the fact that many isolated cases of idiocy, occurring in a family with only a slight neuropathic predisposition, have been associated with some abnormal condition of the mother while she was carrying the child." [3] Other external factors which he mentions are premature birth, rickets, infectious fevers, meningitis, and the like.

DOMINANCE OF THE GENETIC VIEW

As a result of these various studies, mental deficiency came to be explained for a time almost entirely in terms of heredity.

[1] TREDGOLD., *op. cit.*, p. 23.
[2] *Ibid.*, p. 26.
[3] *Ibid.*, pp. 26-27.

Any reference to environmental factors of causation were regarded with skepticism, if not suspicion. With the exception of the earlier efforts alluded to, all of the histories of defective families were completed between 1910 and 1916. The second decade of the twentieth century may be taken, then, as the period of the dominance of the hereditary explanation of mental deficiency. During this period, the conclusions concerning the percentage of cases due to heredity were revised upward continually until toward its close, 90 per cent and more of all cases were attributed to it. The question of etiology appeared to be settled, as completely so in terms of heredity as it had been during previous centuries in terms of an omnipotent environment. There was somewhat less assurance about its transmission as a unit character in accordance with the Mendelian formula, but these, to be sure, were details for the experts to cavil over. To its almost exclusively hereditary causation, whatever the principles governing its transmission, the overwhelming majority of students of mental deficiency gave their unquestioning approval.

CRITICISMS OF THE STUDIES OF HEREDITARY MENTAL DEFICIENCY

In blazing a new trail, one must not expect the finished highway. It was inevitable that the methods of the pioneer genealogists should be impugned and their conclusions revised. Subsequent examination of their work has revealed in many cases a glaring lack of critical judgment. The years since 1920 have witnessed a crescendo of criticism until today in many quarters the work of Goddard and others is almost entirely discredited. The following will serve to indicate the nature of the shortcomings emphasized:

1. The outstanding criticism has been directed against the glibness with which feeble-mindedness is assumed, not only among living members of the families studied, but even among those dead, often for many years. Holmes, in commenting upon the study of *The Hill Folk,* writes: "We find in examining the alleged matings of feeble-minded with feeble-minded that in one case all that is said of the mental state of one consort is that he was 'a wild immoral fellow'; of another, that

he was a 'plodding dull drinking fellow'; of another, that he belonged to an 'unintelligent family'; of another, that he was 'a good workman, but very alcoholic,' besides being 'round-shouldered, narrow-chested, and in poor physical condition'; of another, that he was 'a wild fellow' who broke into a house with intent to rape; of another, that he was 'a shiftless drinking fellow' who later got into trouble for assaulting an officer; of another, that she was 'shiftless and neurotic' and married a 'shiftless and alcoholic man.' When such persons are put down as feeble-minded our confidence in the proper classification of the matings becomes rudely shaken. The authors seem to consider shiftlessness as almost tantamount to feeble-mindedness, and if this is combined with alcoholism or sexual irregularity the judgment of the mental condition of the offender is apt to be particularly harsh. Estimates made after a 'brief acquaintance,' or from 'descriptions of others,' etc., when we are attempting to gauge the innate ability of people of little education, raised in a very unfavorable environment, and often with a constitution impaired by the use of alcohol, are apt to be biased. One cannot take seriously conclusions based on evidence of this sort." [1]

Myerson is glibly merciless on the same score. In referring to the "Kallikak Family," he writes: "I confess to a feeling of shame in the presence of the work done by the field worker in this case. I have had charge of a clinic where alleged feeble-minded persons were brought every day and I see in my practice and hospital work murderers, thieves, sex offenders, failures, etc. Many of these are brought to me by social workers, keen intelligent women, who are in grave doubt as to the mental condition of their charges after months of daily relationship, after intimate knowledge and prolonged effort to understand. Many a time it has happened that one of these excellent women has declared that her charge must be feeble-minded or insane, and yet the mental tests and psychological examinations have shown the contrary, that the patient was of full average mentality or better; often it has

[1] Holmes, Samuel J., *The Trend of the Race*, Harcourt, Brace & Company, New York, 1921, pp. 33-34.

happened that the social worker (or the informant) has believed that the 'social problem' was not feeble-minded, and yet the thorough examination has disclosed undoubted feeble-mindedness. And I have to say of myself, with due humility, that I have had to reverse my first impressions many and many a time.

"Judge how superior the field workers trained by Dr. Goddard were. Not only do their 'first glance' tell them that a person is feeble-minded, but they even know, without a shadow of doubt in so far as the book intimates, without the faintest misgiving, that 'a nameless girl' living over a hundred years before in a primitive community, is feeble-minded. They know this, and Dr. Goddard, acting on this superior female intuition, founds an important theory of feeble-mindedness, and draws sweeping generalizations, with a fine moral undertone, from their work. Now I am frank to say that the matter is an unexplained miracle to me. How can one know anything definite about a nameless girl, living five generations before, of whom there can be no records, whom no one remembers, whom no one has seen? Granting for the sake of argument that perhaps she had a mole on her left arm above the elbow by which she may have been identified by her contemporaries, how can anyone know that she was feeble-minded? I cannot get any definite information about my great-great-grandfather, much as I have tried—but a girl who left so little impression on her times as to be 'nameless' is positively declared to be feeble-minded. It seems to me that the elaborate and excellent psychological tests used (and in part evolved) by Dr. Goddard might well be declared superfluous in the face of such transcendent knowledge." [1]

2. A second criticism has emphasized the fact that the conclusions of a few years ago were based largely upon a selected and therefore non-representative group of cases. "These studies had as their case material either notoriously defective stocks (selected because of their notoriety) or the feeble-minded found in institutions and of the families of these in-

[1] Myerson, Abraham, *The Inheritance of Mental Diseases,* Williams & Wilkins Company, Baltimore, 1925, pp. 78-79.

stitutional feeble-minded. Goddard's famous study of the Kallikaks was suggested by the presence of a member of this family in his institution. Likewise the conclusions in his book on *Feeble-mindedness: Its Causes and Consequences* were drawn from a study of the cases at Vineland and their kin. Dugdale traced the Jukes through the members of that family who were found in prison. 'The Hill Folk' study was the outgrowth of inquiry into the pedigrees of some inmates of the Monson State Hospital at Palmer, Massachusetts, who belonged to this stock. It was altogether natural that institutional cases or well-known defective families should have been selected for study because the data concerning them was ready to hand, and observation was comparatively easy. What is more, until recent years the known feeble-minded consisted almost entirely of these classes.

"Naturally, to show by means of elaborate investigations and a series of carefully prepared charts that feeble-mindedness was transmitted regularly in one family from generation to generation did not prove that all cases of mental deficiency originated in the same way. Likewise, institutional cases were not typical of all the feeble-minded. They were a selected group and the selection worked in two ways:

(1) The chief social offenders among the feeble-minded and the very low grade cases, in short, the most troublesome, were the ones who were sent to institutions. The quiet, orderly, industrious ones could get along outside.

(2) The hereditary type was most likely to require institutional care because of the inability of the parents, also feeble-minded, to care for properly, and so bring up, their offspring as to keep them out of difficulty.

"What was said and written about these institutional feeble-minded with regard to their evil propensities and the hereditary character of their defect may have been all true. Yet more recent evidence has shown that what was said and written of this familiar type of the feeble-minded was not typical of the feeble-minded as a class, either biologically or socially considered." [1]

[1] DAVIES, *op. cit.*, pp. 76-77.

3. Another question which presents itself concerns the method of tabulating the results in these genealogical investigations. Apparently the base on which the respective percentages of causes are determined is the total number of individual cases. Is this correct? Ought four feeble-minded children born to one feeble-minded father and mother be counted four times among the causes of mental deficiency, or but once? Ought the percentages be determined on the basis of the number of mentally defective enumerated, or of the number of matings involved? In assuming the former, as has been the case, does not the relative importance of heredity turn on the number of offspring in the respective families? Would it not be more accurate to compare heredity with other causes, regardless of the number of times a cause operates in one family? Is not our prime interest the ways in which mental deficiency may be caused, and the relative importance of these several ways?

4. Again, increasing importance is being attached to the effect of various environmental influences upon the germinal protoplasm before and after conception. The experimental work of Stockard on animals, the biologic work of Davenport on the eugenics of family studies, and other investigations, have tended to discredit the purely genetic view of feeble-mindedness and to prove that it must be seriously modified as the basis for even a tentative program. In point of fact, various accidental factors of imperfect development of germ plasm either before or after conception, the exogenous factors or modifiers of the rates of development of the embryo and fetus, the endocrine and toxic factors during gestation, both in the mother and the child, which later are expressed in mental defect, must give us pause in the evaluation of the genetic view that has been until recently held valid.[1]

5. Finally, the theory that mental deficiency is inherited as a unit character in accordance with the Mendelian formula is now rather definitely rejected. "Most of the facts of the inheritance of mental defect are conformable to the hypo-

[1] Clark, L. P., "The Importance of a Special Educational Training for Mental Defect Dependent upon Organic Lesions," *Mental Hygiene*, Vol. VI, October, 1922, No. 4, p. 709.

thesis that such defect is dependent upon a number of factors instead of a single one. If the factors for heritable qualities are borne by chromosomes, as there is now such strong evidence for believing, is not every chromosome, or even every part of a chromosome, the bearer of factors that influence mentality? Is it conceivable that there is a unit factor for mind located somewhere in a chromosome? . . . I very much doubt if the facts concerning the inheritance of defect are as yet known with sufficient precision to warrant our trying to force them into simple Mendelian formulæ. Of course, if two stocks differ by a single factor only, their progeny would be expected to afford an illustration of simple Mendelian inheritance. But since the inheritance of any human family probably differs in very numerous ways from that of any other, and since any change in any part of the germ plasm could scarcely help having a certain influence on the mentality of the individual concerned, it is *a priori* very improbable that the inheritance of mental defect is adequately describable in simple Mendelian terms. Most of the charts which group human beings categorically as feeble-minded or normal, as we class mice as gray or albino, take no account of the varied manifestations of mentality which really occur. They are liable to give a false or misleading appearance of simplicity which in fact has no existence." [1]

REVISING THE PERCENTAGE

Meanwhile, the emphasis upon heredity as an etiological factor has been undermined from another quarter. "In recent years, in an endeavor to discover and be of help to the large number of feeble-minded in the community, certain of the more progressive states have organized free clinics to which parents, social workers, and others are invited to bring mentally defective children for examination, and advice as to care and training. Similar clinical studies have been made of feeble-minded children found in the public schools. These clinics are bringing to light a type of the feeble-minded heretofore almost unknown as a class. Many of this class come

[1] HOLMES, *op. cit.*, pp. 39-40.

from homes of the better type and have parents who are quite intelligent. Careful investigation of the family history discloses no trace of hereditary taint." [1] The discovery of this new type, together with the discrediting flaws brought out in the earlier investigations emphasizing heredity, are leading to marked revisions of opinion as to the relative rôle of the hereditary factors. Current estimates place it nearer to 40 than to 90 per cent, as was the case a decade ago.

The late Dr. Walter E. Fernald, who for almost forty years conducted an out-patient clinic in connection with the Massachusetts School of the Feeble-minded, of which he was superintendent, and who had extensive experience in the study of retarded school children in that state, concluded that considerably over one-half of all cases of mental deficiency are of the non-hereditary type. This opinion, which he arrived at in the years immediately preceding his death in 1924, was based on both the negative evidence of the lack of mental defect in the family history and the positive evidence of infantile diseases or accidents. "It is to Dr. Fernald and his work that primary credit should be given for this very important modification of the biological aspects of mental deficiency. Dr. Fernald's scientific temper, his long experience in direct work with the feeble-minded, and his standing as one of the foremost authorities on mental deficiency in this country add great weight to his conclusions." [2]

Two questions present themselves, however, in regard to these recent revisions:

1. How thoroughly have the family histories of the cases brought to clinics been investigated? Does the ordinary clinic have a sufficient number of properly trained workers to gather the necessary information? To what extent are the conclusions concerning this non-hereditary type based on carefully compiled family histories, and to what extent on superficial data, consisting largely of information about the family incidentally gathered? These questions are all the more important when it is recalled that such clinics are apt to deal

[1] Davies, *op. cit.*, p. 77.
[2] *Ibid.*, p. 79.

with the higher grades of mental deficiency. It is exactly this higher-grade case which it is most difficult to identify, both in the clinic and in the family history.

2. To what extent are the cases appearing in these clinics a selected group? Do they constitute the residue after the obvious and pronounced cases have been weeded out for institutional care? Is the clientage of the clinic any less selected than the population of the institution? If, as critics have alleged, the hereditary group is more apt to find its way into the institution, then it follows that the non-institutional group is a selected group, with a relatively large number of non-hereditary cases. Is allowance made for this fact? It is barely possible that the percentages of cases attributed to heredity among the institutional and non-institutional groups, respectively, are approximately correct. The error may have consisted in the application now of one, now of the other, proportion to the problem as a whole.

TYPES AND CAUSES OF MENTAL DEFICIENCY

It is apparent from the foregoing that there is agreement on the existence, if not on the relative importance, of two types of mental deficiency and two main groups of etiological factors—the non-hereditary and the hereditary.

Non-hereditary Mental Deficiency.—Clinical study is revealing a variety of causative factors among the non-hereditary group, the more important of which will be discussed briefly.

1. Injuries to the cranium, involving the brain.—"Severe injury to the head, in which the skull is fractured and the brain is involved, may result in arrest of mental development, if it occurs in a young child. Even though the skull remains intact, it is possible to bring about the catastrophe if the injury is of such a nature as to produce hemorrhage within the brain." [1] Trauma at childbirth may cause hemorrhage in the meninges, brain injury, and be associated with hemiplegia, diplegia, etc. "The only possible heredity involved in such situations is the type of pelvis of the mother, or the overlarge

[1] HOLLINGWORTH, *op. cit.*, p. 248.

head of the child. Quite often the causative factor is the unskilled application of forceps of the accoucheur. Since the functions of the brain are in part localized, though in an imperfectly known manner, a lesion in certain areas will, if extensive enough, cause feeble-mindedness in any one."[1] Paralysis of one or more limbs is a very common feature of such cases. This condition, due to pressure during birth, is called Little's disease, for the physician who originally described it.

2. Infectious disease during childhood.—Encephalitis, meningitis, and other acute infections affecting the nervous tissue in a growing child may cause feeble-mindedness, sometimes with epilepsy. Only a few of such cases recover completely. In most cases the intelligence is impaired, sensory defects are frequently present. Since serum has been used in epidemic cerebrospinal meningitis, less of this type of feeble-mindedness has resulted.

3. Endocrine factors.—"It is well known that mental deficiency may result from malfunctioning of the thyroid gland. If during the years of growth this gland does not secrete its product into the system, the result is a child showing the following characteristics: stunted physical growth, spade-shaped hands and feet, legs short and bowed, a broad nose, a thick, coarse tongue, and a shallow, parchment-colored skin, which is dry, rough, and so redundant that it wrinkles on the face and scalp. The *tout ensemble* gives us a gnome-like little creature, easily recognized for what he is by one who has seen many cases so affected."[2]

These children are called cretins. Although referred to as feeble-minded, they constitute essentially a problem in endocrinology. "The specific medicinal treatment is thyroid extract, and if the case is diagnosed in the first year of life, and treated regularly and persistently during life, the individual may in some cases approximate normal development. In other cases no effect of the treatment can be noted. What

[1] MYERSON, *op. cit.*, pp. 74-75.
[2] HOLLINGWORTH, *op. cit.*, pp. 241-242.

the result of treatment will be in any given case is, therefore, unpredictable." [1]

Experience with cretins naturally has led to the expectation that other cases of mental deficiency may finally be traced to endocrine disorders. In particular has this suggestion been made in regard to mongolians, the name given to a small number of defective children whose low mentality is associated with physical characteristics like those of the Mongolian race, and with dwarfism of an extreme degree. Mongolians appear usually in a normal family, often the last member of such a family, but aside from that there is no evidence of any abnormal heredity. In the early months of life mongolians are mistaken sometimes for cretins, but as development progresses, the differences become apparent. Undoubtedly, it is this fact of early resemblance to cretinism which has suggested the endocrinal etiology. Thus far, however, no cause for mongolianism has been established. Research into the effects of the endocrine system upon mental, as well as upon physical, development is progressing, and another generation or two may witness startling revelations in this direction.[2]

4. Toxic influences.—"There is also a group in which gross failure of brain development, or gross failure of the organs of sense, has brought about idiocy. These individuals remind one of the monstrosities that biologists obtain by subjecting eggs to various chemicals, and indeed they belong in the field of teratology rather than in psychiatry. They are simply viable monsters; there is usually nothing whatever in their antecedents to account for them. . . . The fact that similar caricatures on life can be created by experimental toxic influences working on healthy eggs suggests strongly that something of this nature is responsible." [3]

Stockard, for example, who has done considerable experimentation along this line, makes the point that all types of monsters are developmental arrests and due to environmental

[1] HOLLINGWORTH, *op. cit.*, p. 242.

[2] BERMAN, *The Glands Regulating Personality*, The Macmillan Company, New York, 1922.

[3] MYERSON, *op. cit.*, p. 76.

changes. He gives a long list of methods and techniques by which this can be brought about and compares it to feeble-mindedness in a very pertinent manner.[1] Tredgold, too, inclines to agree that this variety of mental deficiency is due to some form of toxin, though "the pathogenesis of this disease is as yet very obscure."[2]

5. Alcohol has received considerable emphasis in this connection. Tredgold finds it present in the family history of no less than 46.5 per cent of his cases. "It is to be remarked, however, that in five-sixths of these there was a definite neuropathic predisposition also, while in most of the remainder there was a history of other morbid influences.

"It is necessary to point out that alcohol may act in two ways. I have already adduced facts showing that it may undoubtedly so impair the germ plasm as to cause pathological variation; but it may also have a direct effect upon the embryo after fertilization has taken place. As is well known, the ingestion of alcohol is rapidly followed by its appearance in the blood, and since it has been conclusively shown by numerous experiments that alcohol has a most baneful effect upon growing protoplasm, it follows that the systematic abuse of alcohol by a pregnant woman may be attended with decidedly injurious consequences to the offspring. In dealing with alcoholism, therefore—and the same applies to such other toxic agencies as tuberculosis, syphilis, lead, etc.—unless the father alone has been affected it is not always possible to say whether the effect is upon the germ plasm or upon the growing embryo," or both.[3]

After reviewing some contradictions in the evidence, he concludes that "there is now conclusive evidence that either paternal or maternal alcoholism may, in the absence of any other factor, produce mental defect; but in my experience such a result is not common in this country, and its chief action seems to me to lie either in giving rise to that initial impairment of the germ plasm which may be the forerunner of

[1] Stockard, C. R., in *The American Journal of Anatomy*, 1919.
[2] Tredgold, *op. cit.*, p. 62.
[3] *Ibid.*, pp. 43-44.

amentia, or in accentuating a neuropathic diathesis which already exists."[1]

6. That syphilis is a factor in the causation of mental deficiency seems to be unquestioned. Concerning its relative importance in this connection, there are, however, wide differences of opinion. The Solomons, after careful consideration of the subject, are rather cautious in their conclusions. Since the average of positive Wassermann reactions among hospital children is about 5 per cent, and in institutions for the feeble-minded but 6 per cent, they conclude that "it is not possible to state, as is so often done, that congenital syphilis is a great element in the production of feeble-mindedness," although, "on the other hand, there seems to be little chance for doubt that certain individual cases of feeble-mindedness owe their origin to syphilis in the parent."[2] The problem, they point out, is further complicated by the fact that "a congenital syphilitic may have a coexistent feeble-mindedness which is hereditary, that is due to the presence of feeble-mindedness in the family caused by other conditions than syphilis."[3]

Myerson tends similarly to minimize the importance of this factor. "Here, as everywhere," he says, "it is difficult to separate coincidence from cause. Because the parents have syphilis does not prove that the mental defect of the child is due to that disease. Though there are a few well-recognized signs of congenital syphilis, various authors have described minute phenomena as also diagnostic of syphilis. The trouble with these signs of degeneracy is that they are far more common than syphilis itself and it is difficult to establish any causal relationship. Further, the Wassermann reaction is very uncertain after the fourth or fifth year of life in the congenital syphilitics, except where we deal with congenital babies or paresis. It is therefore difficult to state, except in definitely diagnostic cases, that syphilis has caused feeble-mindedness. These definite cases constitute from 1 to 4 per cent of hospital

[1] Tredgold, *op. cit.*, pp. 44-45.

[2] Solomon, H. C., and M. H., "Syphilis of the Innocent," United States *Interdepartmental Social Hygiene Board*, Washington, 1922, pp. 68-69.

[3] *Ibid.*, p. 67.

cases and are frequently familial—*i.e.,* occur in two or more siblings. Possibly this is a minimum estimate, and there occur possibly a number of lightly affected individuals, blighted personalities, whose condition cannot definitely be ascribed to syphilis." [1]

On the other hand, Clark and Atwood, who are very skeptical of the data on the heredity of mental defect, writing in 1922, "cite Wilmarth and Southard as showing the comparatively large number of cerebral diseases in autopsies on the feeble-minded. Thus in 70 such autopsies Wilmarth reports nearly 75 per cent as showing gross cerebral lesions. Cohen and Clark state the fundi in feeble-minded show much actual change, from which they conclude that the neural side of feeble-mindedness is fully as important as the psychic side. Clark and Atwood are inclined to believe that alcohol and syphilis injure germ plasm and that such injury is responsible for a great deal of mental defectiveness. It is implied throughout their writing, though not explicitly stated, that germ-plasm injury or actual cerebral organic injury to the individual is responsible for most of feeble-mindedness." [2]

7. Malnutrition is frequently alleged as a factor in mental deficiency as well as in mental retardation. Since the physical health and development of the growing child are so dependent on the quantity and quality of food, it has been assumed by some that it has a similar effect upon the mental development. It is an important question, particularly from the point of view of prevention.

Dr. J. H. Waite has found that school children in Queensland suffer from a considerable degree of mental sluggishness and retardation in consequence of the anemia due to hookworm.[3] Investigations of the same question have been made in the United States, but the results are somewhat difficult to interpret.[4]

[1] Myerson, op. cit., pp. 76-77.

[2] *Ibid.*, p. 85.

[3] J. H. Waite, in the *Medical Journal of Australia,* January 4, 1919.

[4] Kelley, T. L., "The Effect of Hookworm and Malaria upon Physical and Mental Development of School Children." *Elementary School Journal,* Sep-

More recently, Blanton has made an attempt to study this question scientifically among school children in Trier, Germany, who had suffered seriously from malnutrition during the war. He writes: "Children free from organic nervous disease, and with parents of average intelligence, very rarely become feeble-minded through malnutrition, even of an extreme degree. One of the most important things shown in this whole study is how the nervous system of children of good nervous stock can resist malnutrition of an extreme degree extending over three years. But the feeble-minded, the border-line defectives, and those classed as dull . . . are affected, and often permanently so, by malnutrition of even a moderate severity. . . . The feeble-minded drop to lower levels of intelligence. The border-line defectives become like the definitely feeble-minded, and the normally dull children become like border-line defectives."[1] It is unfortunate that these conclusions rest upon a rather limited number of students.

Hereditary Mental Deficiency.—With few exceptions, students of mental deficiency are convinced that there is a familial transference of certain types of mental deficiency. Here, however, agreement ends. The general percentages cited vary decidedly, and are constantly being revised.

The trend of opinion is certainly away from the conception of feeble-mindedness as a unit character. To speak serenely of it as if it were a nice, easily juggled character instead of comprehending ranges and ranges of problems of entirely diverse natures is to do violence to the facts.

There is appearing the belief that these familial cases originate in injury to the germ plasm. In many cases, feeble-mindedness appears to be the result of something which has blighted the entire organism. "It is notorious that the lower

tember, 1917. See also STRONG, E. K., "Effects of Hookworm Disease upon the Mental and Physical Development of Children," *International Health Commission*, Bulletin No. 3, Rockefeller Foundation, New York, 1916.

[1] BLANTON, S., "Mental and Nervous Changes in the Children of the Volksschulen of Trier, Germany. Caused by Malnutrition," *Mental Hygiene*, July, 1919.

the mental level the greater the degree of physical defect, though there is by no means an exact parallelism." [1]

Concerning the mode of transmission, but one thing is certain, and that is our uncertainty. The problem assuredly is a vastly more complex one than the popular heredity charts of several years ago made it to appear.

The existing state of knowledge on the whole subject permits of no final conclusions. Not only does this indicate the importance of much further study and investigation, but it suggests the caution which needs to be exercised in the formulation of social policies and programs.

It seems clear that if any progress is to be made in the determination of the importance of hereditary factors, the nature of those factors must be known. Studies in heredity must deal with biological traits, not with the possible social results of the presence or absence of such traits. Assuming for the moment that feeble-mindedness is always the result of defective general intelligence, transmitted as a unit trait, a really scientific study demands that the level of intelligence and not the social result be identified in the family history. Has this been done in the more recent studies of non-institutional cases, which studies, as has been pointed out, have depreciated the importance of hereditary factors? This question is particularly significant when the etiology of the higher grades of mental deficiency is considered.

Moreover, the condition with which we are concerned is not the result of a simple elementary trait. Numerous considerations warrant the conclusion that it is due to the absence, "now of one set of traits, now of quite a different set. Only when both parents lack one or more of the same traits do the children all lack the traits. So if the traits lacking in both parents are socially important the children all lack socially important traits—*i.e.,* are feeble-minded. If, on the other hand, the two parents lack different socially significant traits, so that each parent brings into the combination the traits that

[1] MYERSON, *op. cit.*, p. 83.

the other lacks, all of the children may be without serious lack and all pass for 'normal.' " [1]

The problem is further complicated by the fact that we have to deal in studies of heredity with families as we actually find them. It is impossible to be as confident of all the facts as we can be in experiments with animals under laboratory conditions, for it is generally admitted that in dealing with families of low intelligence level there often is uncertainty as to the parentage of the individual under observation.

Such facts suggest the difficult, but by no means the impossible, nature of the task before us. Science has surmounted obstacles greater than these. The essential requirement is that they be recognized. It remains for future researches to reconstruct present conclusions in the light of careful investigations of the facts, involving the transmission of a variety of specific biological factors which, modified by environmental stimuli, may lead to the social condition with which we are concerned.

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CHAPTER XXIII

SOCIAL CONTROL OF THE MENTALLY DEFICIENT

What shall society do with its mentally defective members? How have they been dealt with in the past? What are the chief emphases in their treatment at the present time? What are some of the essential requirements of an adequate program for their control?

Questions concerning the nature, extent, and causes of mental deficiency, such as have been discussed in the preceding chapters, are important, in the last analysis, primarily because of their bearing upon the problem of control. So fraught with menace is the existence of this element in the population, so intimate is its relation to our various social problems, especially in a civilization so complex as ours, that nothing short of society's most effective and intelligent efforts in dealing with it will suffice.

THE PERIOD OF EXTRA-SOCIAL STATUS

It is a significant fact that the Greek roots from which the word idiot is derived are *"iditas,"* meaning a private person, or *"idios,"* indicating peculiarity—that is, a person set apart. Both roots, it will be observed, involve the concept of non- or extra-social status, and it was as such extra-social beings that the mentally deficient were regarded for many long centuries.[1]

The Ancient Period.—In primitive societies, defectives were apt to be allowed to perish from deliberate exposure to death perils. "Neglect or abandonment of idiots to their fate was countenanced by the laws of Lycurgus, and was openly practiced by the Spartans. Cicero intimates that the practice also flourished among the Romans. The Greeks, a race of ancient eugenists, probably were actuated by eugenic motives. The

[1] Davies, *op. cit.*, p. 24.

Greek philosophers had observed how nature, operating through the law of natural selection, permitted only the fittest to survive. In legalizing the deliberate extermination of the feebly gifted by a process of social selection, the Spartans probably considered that they were merely applying a natural law to the conduct of human affairs. Undoubtedly the motive, in part at least, was the desire to prevent racial degeneration through the breeding of contaminated stock." [1]

There are instances, however, even in ancient times, of a more tolerant attitude. If the defective person was merely simple and showed no violence and no particular eccentricities, he was known as a "fool." The equivalent of this old English word can be found in most of the Aryan languages. These "fools" were not infrequently attached to the homes of the wealthy for the amusement of the family and the diversion of guests. This custom seems to have arisen among the Romans, and while subsequently regarded as an inhuman practice, constituted, nevertheless, a distinct advance over the more heartless measures usually pursued at the time.

The Christian Era.—The example of Christ in pitying the demoniac and idiotic children who were brought to him, and the teachings of the religion which he founded as to the duty of mankind to the weak and helpless, wrought an improvement in the status of the mentally deficient. St. Paul's injunction to "comfort the feeble-minded" [2] probably applied to the mentally weak. The Bishop of Myra (the Saint Nicholas of our Christian time) is said to have shown particular compassion toward these unfortunates, and to have organized charitable efforts for their care and protection. Uphrasia, in the family of Theodosius, devoted years to their care. While the Christian influence led to no efforts at education or training, it did result in an improvement of the physical care given to them.

Incidentally, it might be added that various Oriental religious leaders—Confucius, Zoroaster, and Mohammed—en-

[1] WALLIN, J. E. W., *Problems of Subnormality,* World Book Company, Yonkers, 1917, p. 2.

[2] I *Thess.* v: 14.

joined the care of the feeble-minded as a duty upon their followers. The Koran, with an insight rather marvelous for that time, says: "Give not unto the feeble-minded the means which God hath given thee to keep for them; but maintain them for the same, clothe them, and speak kindly unto them."

Medieval Times.—"During the Middle Ages the attitude assumed toward the feeble-minded was extremely vacillating. The court jesters and buffoons are said originally to have been imbeciles, while imbeciles furnished a good deal of the entertainment in the castles of the rich. This attitude of frivolity, however, changed to one of superstitious reverence. The senseless, silly chatter of the imbecile became the revelation of 'heavenly infants,' or 'infants of the good God.' Imbeciles were thought to be under the special protection of the divine and to hold communication with the unknown. Tycho Brahe's companion in his astronomical laboratory was a fool, to whose babblings he listened as to the revelations of an emissary from the Most High. Houses in which feeble-minded children were born were thought to be divinely blessed. During this period the feeble-minded in Europe were allowed to roam unmolested, just as in modern times they were permitted to roam the streets and highways of Brazil, soliciting alms. Here they are rarely refused alms, hence one feeble-minded person may sometimes support a whole family. The attitude of superstitious reverence of the feeble-minded is said still to survive in parts of Ireland and Brittany and in some Oriental countries. Among the latter, Turkey accords the feeble-minded special privileges as sacred beings. As 'Children of the Great Spirit' the American Indians likewise permitted the feeble-minded to roam about unharmed. In England, through laws enacted during the region of Edward II (1307 to 1327), imbeciles were even placed under the protective and administrative oversight of the king. The king administered the estates of 'natural fools,' providing for their sustenance and restoring the property to the legitimate heirs upon the demise of the owner." [1]

The Period of the Renaissance and Reformation.—Unfor-

[1] WALLIN, *op. cit.*, pp. 5-6.

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tunately, the ancient cruelties were reënacted during the period of the Renaissance and Reformation. The Protestant reformers seem to have returned to the earlier way of regarding these unfortunates, Luther and Calvin openly denouncing them as "filled with Satan." To exorcise the possessing demons, the feeble-minded were to be "mentally scourged and bodily tortured." "This process of 'purgation' or exorcism, however, probably wrought a greater change in the hearts of those who attempted the purging than in the souls of those who were afflicted, for the crusade of cruelty was replaced by a campaign of beneficent protection. At this time the first organized public effort upon any scale was begun to provide for the physical care and comfort of the feeble-minded in a residential institution. This attempt was made in France in the middle of the seventeenth century by St. Vincent de Paul." [1]

Throughout the centuries, whether shunned, ostracised, derided, persecuted, neglected, reviled, or revered, the conception of the mentally deficient as extra-social beings persisted. They stood outside of the pale of humanity, considered incapable of normal human intercourse. The most enlightened efforts put forth in their behalf were limited to physical care. No attempt was made to study scientifically their mental condition and their needs, or to train and educate them.

THE PERIOD OF PEDAGOGICAL EXPERIMENTS

It was not until the beginning of the nineteenth century that the first educational approach of a scientific character to this problem was made. In 1798 a party of sportsmen, hunting in the woods of Caune, department of Aveyron in the southern part of France, chanced upon a wild creature of the human species, a boy of twelve years, who roamed through the woods like an animal, feeding upon acorns and nuts. "The boy was brought to Paris and presented before the Academy of Science, where he excited a good deal of interest and speculation. Observed in confinement, he resembled a wild animal more than a human being: unable to speak, he expressed his wants by inarticulate cries; he selected his food by smell, but

[1] WALLIN, *op. cit.*, p. 6.

was indifferent to either fragrant or foul odors; he drank while lying flat on the ground and immersing his mouth in the water like a horse; he often walked on all fours, or when taken for a walk always fell into a running gait; he would sway sidewise like a caged beast; he fought with his teeth, bit and scratched those who interfered with his desires, tore off his garments, constantly attempted to escape, and evinced a voluptuous delight in the phenomena of nature, particularly storms or a snowfall, which would evoke peals of joyous laughter or expressions of frenzied rage. His ears were insensible to the loudest noises—he gave no attention to a pistol-shot—and to music, and yet he would hear the fall of a nut. . . . Such was this 'child of nature' who became the corner stone of the scientific pedagogy of the feeble-minded—the first 'wolf boy' to receive educational treatment." [1]

Itard's Efforts.—The education of this boy was undertaken finally by Jean Marc Gaspard Itard (1775-1838), a French otologist and philosopher, who was physician to an institution for the deaf in Paris. "Itard was unwilling to believe that the boy was an idiot, but was of the opinion that he was simply wild or entirely untaught." [2]

Much interest centered about Itard's experiments with this boy, "largely prompted by the desire to settle the psychological and philosophical controversy between the empiricists and nativists as to the origin of ideas and the original constitution of man. According to the empiricists (or sensationalists) all ideas come from sensation. Before the mind has been acted upon by stimuli it is a *tabula rasa,* an impressionable slate *sans* any marks or characters. The nativists, on the other hand, maintain that ideas are innate. They are potentially present in the mind, just as the oak is potentially present in the acorn, and need only the play of environmental stimuli to make them explicit or render them kinetic. They are like 'latent contents' which are merely made 'manifest' by experience." [3]

Itard's efforts were destined to fail. After five years of the

[1] WALLIN, *op. cit.,* pp. 11-12.
[2] DAVIES, *op. cit.,* p. 27.
[3] WALLIN, *op. cit.,* 12-13.

most systematic and intense course of sense learning on record, he realized that the results he had anticipated could not be secured, and he relinquished the care of his subject. "Since my pains are lost and my efforts fruitless," he exclaimed bitterly, "take yourself back to your forest and your primitive tastes."

But the French Academy of Science "realized more fully the important positive contribution that Itard had made to educational science, and commended him for his ingenuity, sagacity, courage, and patience. The members of the Academy reported that a big change had come over the boy during his five years of training. He had been taught to make relatively fine sensory discriminations, to recognize objects, to identify letters, to read a little (although he understood little of what he read), to comprehend the meaning of many words, to use adjectives and verbs, to copy words, to write words from memory, and to write words expressing his wants (although unable to understand written communications), to make a few generalizations, to prefer the foods of civilized life, and to prefer social life to the isolated existence in the wild. Itard, in fact, had demonstrated that even idiots can be improved more or less by appropriate sensorimotor and moral training, and he had laid the foundation for the psycho-clinical and psycho-educational observation of the individual pupil, just as the individual patients are clinically studied in the hospitals. Itard did not realize the far-reaching nature of his results because he did not understand that there are all degrees of mental deficiency and that the fruits of training will vary according to the degree of mental handicap." [1]

The Work of Edward Seguin.—It was Edward Seguin, one of Itard's most gifted pupils, who appreciated more fully than his master the significance of the results obtained with this first "wolf boy." Seguin was born in 1812 in France—the country that had become the cradle of the scientific study and treatment of the deaf, the blind, and the feeble-minded. He was both physician and psychologist. In addition to studying medicine and surgery under Itard, he had also been

[1] WALLIN, *op. cit.*, pp. 15-16.

a pupil of the famous psychiatrist, Esquirol. It was this same Esquirol who first formulated a clear definition of idiocy, conceiving of it as a condition of arrested development and not as a disease.

Seguin entered upon his great work with an unbounded faith in the potentialities of human nature, and intent upon devising a system of education based upon the principles of physiology—a system which Itard had given up in despair, but which Seguin believed to be of superior value not only for subnormal, but also for normal children, capable of regenerating mankind.

Thus inspired, in 1837, at the age of twenty-five, he established in Paris the first successful school for the specific purpose of educating idiots. His experiment attracted visitors from all over the civilized world, and won for him in 1842 the directorship of the enlarged school for idiots at the Bicetre. Two years later, a committee from the Paris Academy of Science, after a critical examination of his work, reported that he had solved undoubtedly the problem of "idiot" education. His book, *The Moral Treatment, Hygiene, and Education of Idiots and Other Backward Children,* published in 1846, is a classic landmark in the literature of mental deficiency. It has been termed the "Magna Charta of the emancipation of the imbecile class."

"Seguin's 'physiological education' is essentially a system of sensorimotor training designed to develop imperfect sense organs, both as 'faculties and as functions,' supplemented by moral, intellectual, and vocational training. His aim was 'to lead the child . . . from the education of the muscular system to that of the nervous system and the senses,' and 'from the education of the senses to general notions, from general notions to abstract thought, from abstract thought to morality.' Just as Pestalozzi psychologized education, Seguin would physiologize it." [1]

Developments in the United States.—The published results of Seguin's work, together with that of other Europeans work-

[1] WALLIN, *op. cit.*, p. 19.

ing in the same direction, soon led to similar experiments in the United States. While a number of states had organized institutions for the blind, the deaf, and the insane, the feeble-minded, until the fifth decade of the nineteenth century, had been totally neglected. Only the almshouse and the jail were available as refuges for them. In 1848 two schools, one private and the other public, were opened in Massachusetts, both for the education of the mentally defective. In 1851 New York followed the example with the establishment of a state school at Albany, which was subsequently transferred to Syracuse. Pennsylvania was next to follow the lead of Massachusetts and New York, then Ohio and Connecticut, until today all but four states have provided special institutions for the reception of this class of dependents.

Revolutionary disturbances at home, combined with urgent invitations from the United States, brought Seguin to this country in 1848. Not only was his presence helpful in the founding of these early American state institutions, but it was instrumental in the development and direction of their work. He served for a short time as the superintendent of the Massachusetts school, assisted in the organization of the work at Syracuse, New York, and was associated for a time in the direction of the Pennsylvania Training School at Elwyn, near Philadelphia. In 1880 he opened a private school in New York City, but came to his death the following October.

The Significance of Seguin's Work.—The organization of separate public training institutions for the feeble-minded was due, in a very large measure, to the inspiration and leadership given to the movement by Seguin. It was his work which became the model and inspiration of subsequent educational efforts with the mentally defective, both in and out of those publicly supported. In fact, the methods which he advocated for educating the senses and training the muscles to directed, accurate response, form the basis of those employed up to the present time. At the Massachusetts School for the Feeble-minded at Waverly, for example, "the methods devised by Seguin and carefully worked out and applied by later ex-

perts are used in the training of the children there. Object teaching, instructive games, manual training, educational gymnastics, in fact many of the methods employed in kindergartens in the training of normal children, are used to awaken the inactive special senses of the feeble-minded children and to train their muscles." [1]

As to Seguin's hope of curing idiocy by the application of the physiological method, or at least of so greatly improving their condition as to enable them to be returned to the community capable of self-guidance and of earning an independent livelihood, the verdict of experience has been in the negative. All of the early schools for the feeble-minded were organized definitely with this purpose in mind. They were to be schools, not asylums for incurables. Preference for admission was to be given to high-grade and improvable types. Yet, despite this more favorable material with which to begin, the results were disappointing. Improvements in physical and muscular development, in habits, in self-help, in occupational ability, there were in many cases. But, as is now well appreciated, no case of actual mental deficiency was cured. The best efforts of teachers trained in the approved physiological methods could do no more than help them to the limits of their endowments.[2]

SOME RECENT SOCIAL EXPERIMENTS

Just as the first half of the nineteenth century witnessed the first scientific attempts to educate mental defectives, so the second half brought a recognition of social responsibility for dealing with the problems which they presented. This increasing sense of responsibility, coupled with the failure of pedagogical projects, led in turn to several important social experiments, which we shall now consider.

CUSTODIAL CARE AND THE POLICY OF SEGREGATION

As the early "schools" for the mentally defectives slowly relinquished their hopes of cure, they began to find themselves

[1] DAVIES, *op. cit.*, p. 32.
[2] *Ibid.*, pp. 32-35.

besieged on two sides. "The parents and guardians of the children who had completed the regular course of training and theoretically should have been ready to return to the community, begged that these boys and girls (now young men and women) be retained in the institution because of their obvious inability to be anything but dependents demanding a great deal of care if they should be returned to their homes. On the other hand, there was an even greater demand from all sides for the admission of new cases of all ages and all types. It became more and more evident that the state must squarely face the large and less hopeful problem of providing indefinite custodial care for low-grade cases." [1]

The past thirty-five years have witnessed a rapid increase in special institutional facilities for the feeble-minded. In 1890, only 5,254 were in special institutions, 2,469 were in hospitals for the insane, and 7,811 were in almshouses. In 1904, the number in special institutions amounted to 14,347, while 16,551 were in poorhouses. In 1910, the number in special institutions had risen to 20,731, while in almshouses there remained 13,238. In 1918, there were 39,381 feeble-minded persons in institutions, and on January 1, 1923, the total number in institutions was 42,954.

These figures are cited frequently in support of the popular belief that feeble-mindedness is greatly on the increase. Such an inference, obviously, is incorrect. What they really mean is that there has been a marked increase in the institutional facilities available as the policy of segregation gained public favor and support. The number of mental defectives in institutions is not now, and never has been, an index of their total number in the population, for the simple reason that institutional facilities have never been able to accommodate more than a small proportion of them. The most conservative estimate of the number of feeble-minded in the United States is many times the number now in institutions.

This statement serves at once, also, to indicate the success of the policy of segregation. Despite the active propagandas

[1] DAVIES, *op. cit.*, p. 35.

which have been waged during the last few decades by social and educational associations for public provisions for mental and social misfits, no state in the Union has yet officially taken cognizance of 10 per cent of the mentally defective persons in that state. Most of our public institutions admitting this group have longer waiting lists than the most exclusive clubs and preparatory schools in the country.

Moreover, the cost of institutional care is such as to make it clear that the development of adequate facilities within a reasonable period of time is out of the question. For the country as a whole, the average annual per capita cost of caring for the feeble-minded in state institutions is over $300. Anyone familiar with the present state of public finance must appreciate that the plan of indefinite custodial care for the problem as a whole is not a feasible one.

EXPERIMENTS IN EUGENIC CONTROL

Davies[1] has aptly termed the period roughly dating from 1900 to 1915 as the alarmist stage in the treatment of the mentally defective. Characterizing this period, as has been pointed out, were the emphasis upon eugenics and heredity studies, the application of methods of intelligence testing, and a marked awakening of the public to the magnitude of feeble-mindedness as a social problem. Institutional facilities being wholly inadequate to care for more than a fraction of the number of cases identified as feeble-minded by the mental tests, the principal concern came to be with those at large in the community who, according to the heredity studies, were rapidly multiplying their kind. During these years there were many predictions that their inevitable increase constituted a dire threat to the not remote future of the race. Radical measures being deemed imperative, and the principle of eugenic control being in the air, attention speedily centered upon sterilization as a desirable and practicable means of meeting the problem.

[1] DAVIES, *op. cit.*, Chap. V.

"Eugenical sterilization was adopted by a number of states in rather rapid succession as a means of ridding the race of its defective germ plasm. The State of Indiana was the pioneer. Its sterilization measure became law on March 9, 1907. The states of Washington, California, and Connecticut enacted similar statutes in the order named in 1909. Nevada, Iowa, and New Jersey followed in 1911. In 1912 New York State passed its sterilization law. Other states to pass such laws to January 1, 1922, were Oregon, North Dakota, Kansas, Michigan and Wisconsin in 1913, Nebraska in 1915, and South Dakota in 1917. Some of the states mentioned passed more than one statute on the subject. In all fifteen states enacted such laws." [1]

Recently, Laughlin [2] reviewed the progress of eugenical sterilization in the United States. From 1907 to 1921, according to his report, the total number of operations performed under these laws was 3,233. Of these, 403 were performed on the feeble-minded, 2,700 on the insane, and 130 on criminals. Of the fifteen states originally enacting such laws, nine retained them (1922) on their statute books. Laughlin concluded that the plan functioned "in a very satisfactory manner" only in California and Nebraska. In New York State, during the years that the law was in force, although thirty state institutions were subject to it, only one operation was performed under its authority.

In summary, it may be said that sterilization as a measure of eugenic control has not been tried to any appreciable extent, and that the tendency to do so has been declining. The temporary popularity of the plan was due to the belief by less informed persons that it offered a quick solution for a pressing problem. More careful students of eugenics problems have never advocated it as more than supporting the more important measure of segregation.

A number of factors combined to account for the failure of the sterilization program. Of these, the most important, as

[1] Davies, *op. cit.*, pp. 61-62.

[2] Laughlin, H. H., *Eugenical Sterilization in the United States*, 1922.

summarized by Davies, are as follows: (1) Public opinion has disapproved apparently of sterilization on humanitarian grounds; (2) the question of doubt as to diagnosis and prognosis, and the difficulty of drawing the fine line between those who should and should not be deprived of procreative powers have served as deterrents in making the decision on a concrete case; (3) many informed persons have opposed sterilization as tending toward the spread of immorality and venereal disease by giving liberty to the individual together with the assurance of immunity from pregnancy and its consequences; and (4) the changing aspects of the relation of heredity to mental deficiency have served to raise doubt as to how much may be gained by sterilization.[1]

Sterilization, it should be remembered, has not been disproved as a social policy: it has simply been untried. It may well be that at some time in the future, with more complete scientific data and different conceptions of society's right to infringe upon those of the individual, such a plan will receive serious consideration.

Two facts bearing upon this plan appear significant. One of these is that the difficulty of correct diagnosis of the feeble-minded varies directly with the possibilities of their parenthood. Conspicuous cases, easy to diagnose, are not apt to mate. The higher-grade cases, where parenthood may result, are much more difficult to identify. A second practical difficulty is that the nature of the operation varies in difficulty inversely with the menace of the case on a sex basis. Sterilization of the male is a relatively simple process, but the feeble-minded male is not apt to be attractive to the female sex. On the other hand, the feeble-minded female is more likely to be taken advantage of by the male, yet here sterilization involves a major abdominal operation. These considerations do not prove the impracticability of this measure, but they do serve to indicate that its practical application is not so naïvely simple as was originally supposed.

[1] Davies, *op. cit.*, p. 64.

EXTRA-INSTITUTIONAL EXPERIMENTS IN SOCIAL REHABILITATION

It has been shown how the hopes of Seguin and his followers to train the feeble-minded to take their places in society were blasted, and how the institutions developed for that purpose became largely custodial in character. But ideas about this group have a habit of not remaining settled. Just as previously accepted views on the biological side have been modified in recent years, so there has sprung up again the hope of restoring some of the mentally deficient to community life.

Present prospects rest upon an entirely different assumption from that held by the pedagogical pioneers. Feeblemindedness appears as incurable now as ever. What has changed is the nature of the group under consideration. Institutional populations up to some twenty years ago consisted of idiots and low-grade imbeciles. It was with these that the earlier pedagogical experiments were made, and failed. Since then, the "discovery" of the moron type, and the alarm concerning them, has brought to the institution a much larger proportion of higher-grade cases. As early as 1915, Dr. Charles Bernstein, of Rome, N. Y., reported that "among the feeble-minded applying here fully 80 per cent are for the reception of such higher-grade cases."[1] Not only do these higher-grade cases present a different proposition from that which confronted the workers in the early institutions, but the approach to the problem is entirely different. Instead of utilizing the method of physiological education with a view of curing idiocy, the present approach is through social education with the object of enabling these individuals to get along by making the most of their innate capacities.[2]

This newer plan for the social rehabilitation of the feeble-minded involves two new developments: the colony plan, and parole with supervision.

The Colony Plan.—Despite the vogue of the segregation

[1] *Twenty-First Annual Report of the Board of Managers of Rome State Custodial Asylum,* Rome, New York, 1915, p. 14.

[2] DAVIES, *op. cit.,* pp. 87-88.

policy for a number of years, there were many workers among the feeble-minded who refused to be reconciled to the desirability of confining in the wards of an institution strong, able-bodied persons simply because they were below par mentally. Although realizing the need of safeguarding many of these people, both for their own protection and for that of society, they insisted with Bernstein that "something more economical and many times more humane than brick and stone walls and iron fences" could meet the need; that it "was both possible and desirable to remove groups of the inmates from the institution proper, place them in a more normal living and working environment where they could be practically self-supporting, and still maintain the necessary degree of supervision to protect the individual and the community." [1]

This is the idea of the colony. "A colony for the feeble-minded, according to the prevailing conception, may be defined as 'any group of inmates living together under supervision outside the parent institution, while remaining under its jurisdiction and contributing to a greater or less degree by labor to their own support.' " [2]

The first colony of this type established in the United States was in 1882 by the Syracuse State School for Mental Defectives. In 1893 the Indiana School for Feeble-minded Youth opened a farm colony of the same kind. Massachusetts came next when a colony was established at Templeton in connection with Dr. Fernald's School at Waverly. All of these older colonies have been successful and are still functioning.

However, it is to Dr. Charles Bernstein, superintendent of the Rome State School for Mental Defectives, Rome, New York, that the credit must go for developing the colony plan on an extensive scale and in a practical way. Altogether, thirty-six colonies have been established in connection with the work at Rome, twenty-two of which are for boys and fourteen for girls. "The Rome colonies have been particularly noteworthy, not only because of their extent and the large number of persons colonized, but especially because of

[1] DAVIES, *op. cit.*, p. 108.
[2] *Ibid.*, p. 109.

the application of several new principles to colony operations: (1) colonizing of women as well as men; (2) establishment of industrial colonies in towns for both men and women in addition to farm colonies for men and domestic colonies for women; (3) using the colony as a definite training center for community life and as a midway station between the institution and parole. In other words, the Rome colonies have not been merely a modified form of institutional care, but they have been made a definite part of the institution's system of training looking toward the social rehabilitation of all cases which upon trial in the colonies show themselves capable of community life. The colony is one stage in the moving-up process. At the same time the Rome colonies provide indefinite care for those 'boys' and 'girls' who can safely enjoy the degree of freedom which the colony affords but probably can never be entrusted to the outside world." [1]

The results of colony care appear to be entirely successful. In the first place, it offers apparently a solution to the taxpayers' problem of providing adequate care. "On July 1, 1922, fourteen farm colonies for boys were in operation in connection with the Rome State School. These afforded accommodations for 358 boys. Placing these boys in colonies made 358 additional beds available in the institution just as truly as if a new institution building of that capacity had been erected. Consider, however, what it would have cost to construct that number of additional beds at the institution. A very conservative cost of institutional construction, whether of the old congregate or the new cottage type, is $1,000 per bed. A state expenditure, a taxpayer's expenditure, of at least $358,000 would therefore have been required to add these 358 beds to the institution. By the colony plan that number of beds was added at an annual cost of $8,600 (including rentals and 7 per cent on the three owned properties), which is considerably less than half the interest alone for one year at 5 per cent on the $358,000. However, the rental costs of the colonies were fully covered by the earnings of the boys so that this additional bed capacity was actually added to the institu-

[1] DAVIES, *op. cit.*, pp. 111-112

tion without one cent of cost to the taxpayer. In addition, the colony plan represented a still further saving to the taxpayer in the fact that the boys contributed in substantial measure to the cost of their maintenance." [1]

Again, the plan seems socially desirable. "With the higher-grade imbeciles and the morons, who are the most numerous group, the habit training, the school work, the expert medical observation and treatment, the regularity and precision of the institutional life, may usually be counted upon so to improve most of them as to make them capable of attending to their own personal needs. Furthermore, in the wards, about the grounds, in the carpenter shop, the paint shop, the shoe-repair shop, the chair-caning shop, etc., and on the institutional farm, the majority have been taught to work and have learned the important habit of industry." [2]

Furthermore, with many of the unmanageable type, "it is found that the cause of their misbehavior is not so much in themselves as in the influence of a bad home or neighborhood environment. Removed to the institutional environment, the individual has just as readily learned socially acceptable forms of behavior as he had previously learned socially unacceptable ways. Many of these latter cases are not markedly defective mentally, the conduct disorder having been the principal cause of their inability to get along outside of the institution. It would be unwise to return them to the home environment in which they had previously failed. And yet their present good behavior, coupled with their ability as workers, would not seem to warrant keeping them indefinitely in the institution." [3]

"The Rome colonies for boys," says Davies, "by their constant record of successful operation since 1906, have more than justified the colony plan of care for this class of inmates. From the standpoint of the public, the colony system for boys has proved itself safe, practical, and economical. From the standpoint of the individual, the plan has proved itself

[1] Davies, *op. cit.*, p. 117.
[2] *Ibid.*, p. 118.
[3] *Ibid.*

constructive in restoring to usefulness and happiness many boys of good potentialities, although limited in intellect, who otherwise would have worn out their lives as institutional automata. The colonies, without added expense to the state, have greatly enlarged the capacity of the institution for service by permitting it to receive for training a larger number of inmates. Most important of all, perhaps, the colonies have been the means of restoring to society much dependable man power that otherwise should have been wasted." [1]

In regard to colonies for feeble-minded girls, there is somewhat less to say because the plan has not been tried so extensively. The Rome State School was the first and until recently the only institution in this country to develop such colonies. Results of these experiments, however, appear to be equally satisfactory. Extension of the plan will be watched with keen interest.

Parole and Supervision.—In 1919, Dr. Fernald published a report on the "After-Care Study of the Patients Discharged from Waverly for a Period of Twenty-five Years." Although the majority of these had been discharged under protest, the results revealed by this study were a revelation and entirely at variance with commonly accepted views of the time. It was found, for example, "that a very small proportion of the discharged male morons had committed crimes, or had married, or had become parents, or had failed to support themselves, or had been bad citizens. It has been fairly well demonstrated that the average male moron, without naturally vicious tendencies, who has been properly trained in habits of obedience and industry, and who is protected from temptation and evil associations during his childhood, can be safely returned to the community when he has passed early adolescence, if his family are able to look after him and give him proper supervision." [2]

On the other hand, "the after-care studies of the female morons who have received training in the institutions were not so favorable, but many of these, too, led moral and harm-

[1] Davies, *op. cit.*, pp. 132-133.

[2] Fernald, W. E., "A State Program for the Care of the Mentally Defective," reprinted from *Mental Hygiene,* Vol. III, No. 4, pp. 571-572.

less and useful lives after their return to the community. The study of discharged female cases at Waverly showed a surprisingly small number who became mothers or who married." [1]

Particularly striking is the following comment by Dr. Fernald: "While it is true," he says, "that defectives with undesirable habits and tendencies are not easily controlled, it is equally true that defectives who are obedient and moral and industrious are apt to continue these traits permanently. It is as difficult for them to unlearn as it was to learn. Those defectives whose tendencies are such as to make them undesirable members of the community should not be allowed their liberty, but should be permanently segregated in institutions. No other class of human beings so surely avenge neglect in their childhood, socially, morally, economically, and eugenically." [2]

Largely as a result of this study, Massachusetts began in 1918 the system of paroling inmates. "By this plan cases deemed suitable for outside life are permitted to return to the community on trial, to remain under the continuing supervision of the institution as exercised by the field agent or social worker of the institution until such time as they give evidence of having sufficiently stabilized themselves in their new life to warrant their discharge. In supervising these cases the social worker does not rely solely upon her own oversight, but makes a special effort to interest in the welfare of the boy or girl responsible men and women of the community so that they may have somebody to whom to go for friendship and counsel, somebody, in other words, who will furnish that direction and leadership which the feeble-minded person of whatever age, as a child, naturally craves and needs. There are many such persons willing to give such a helping hand who can be discovered and interested by a well-trained social worker. It is not so much a matter of giving a great deal of time as it is a matter of regularly keeping in touch with the persons on parole and making them feel that there is

[1] FERNALD, *op. cit.*
[2] *Ibid.*

some one genuinely concerned as to whether or not they make a success of the opportunity which has been given them to establish themselves in the world." [1]

Experience thus far would indicate that parole and supervision, especially if combined with the education of the people with whom they work as to their care, may be extended far more widely than has heretofore been believed possible. In this phase of the work we are far behind England and Germany, both of whom have developed this plan with success for a number of years.

ESSENTIALS OF AN ADEQUATE PROGRAM

All but a few of the states in the Union have made a beginning in the way of a program for dealing with the mentally defective. Yet in no state are more than one-tenth of their probable number treated in institutions, with another 10 per cent at most in special classes. The great majority, therefore, receive no education or training, and no adequate protection or supervision. There is a crying need for suitable consideration of the uncared-for feeble-minded.

The developments to date in the several states vary considerably, both in degree and in method. There is as yet no formal accepted program. The problem is one which cannot be solved by a simple formula, expressed in a definite piece of legislation. "It is an infinitely complex problem, varied according to age, sex, degree and kind of defect, presence or absence of hereditary traits or criminal and anti-social proclivities, home conditions, etc. The idiot, imbecile, and moron present different needs and dangers. Each of these groups has different troubles, according to age and sex. Rural, sparsely settled communities, with homogeneous racial populations, have conditions pertaining to the defective which differ from those of urban industrial centers, with cosmopolitan racial complications." [2]

However, with the increase in our knowledge of feeble-

[1] Davies, *op. cit.*, pp. 97-98.

[2] Fernald, W. E., "A State Program for the Care of the Mentally Defective," *Mental Hygiene*, Vol. III, No. 4, October, 1919, pp. 566-7.

mindedness, and on the basis of our experience with the various experiments which have been described, there has developed a rather definite consensus of opinion as to what a program, reasonably adequate and fairly possible of realization under existing circumstances, should include. The essential features of such a program will be presented in brief form.

1. Identification

Manifestly, the first step in a rational program is to find out who is feeble-minded and how many such persons there are. This would state and define the problem. Estimates of the number of the feeble-minded have been made from time to time, but anything like a careful and complete identification of existing cases is a duty which society has not yet assumed, principally because of the failure to appreciate its importance as a preliminary measure.

To obtain this information for the entire population of all ages is too stupendous a task for present resources. It appears within the realm of possibility, however, to secure it for the coming generation, chiefly through the public school. Present methods of health examination of school children could be extended easily so as to insure and require a mental examination of every child obviously retarded in school accomplishment. Not every child would have to be given such an examination. It would be sufficient to examine only those who are three or four years retarded. This is now required by law in Massachusetts, Missouri, and New York.

The school is the agency best fitted to secure this data, not only because it comes into contact eventually with all children, but also because such information is necessary for its effective work. It is easy enough to set up a prescribed academic curriculum for the theoretic but non-existent average child, and to require all children to conform to it. But the wastefulness and the money cost of such a procedure, if nothing else, makes imperative a readjustment in keeping with the strata of mental ability as actually found in a school population. Not only is a failure to do this costly

to the school, but to society as well, which subsequently pays the bill for the results of a process which makes social outcasts of the school's misfits and failures.

The Development of Clinical Facilities.—In order to achieve this first objective in our program, it is necessary to establish clinics or clearing-houses where the feeble-minded may be identified.

The first psychological clinic in the United States was established at the University of Pennsylvania in 1896 by Dr. Lightner Witmer. Its development was in answer to the challenge of a teacher, who came to Dr. Witmer's laboratory, seeking help for a pupil who could not spell. Her assumption was that psychology should be able to discover the cause of this deficiency and advise the means of removing it. Dr. Witmer accepted the challenge, believing that if psychology were worth anything to him or to others, it should be able to assist the efforts of the teacher in a retarded case of this kind. A thorough study of this case, a fourteen-year-old boy, revealed that his difficulty was an eye defect. After this had been corrected, Dr. Witmer and the teacher worked together to instruct the boy as though he were a mere beginner in the art of spelling and of reading. Other teachers approached the laboratory with their problems, and thus the first psychological clinic in this country came into existence. By 1909, the demand for its services became so great that regular daily clinics were instituted, in which all kinds of mental and moral deviation are handled. At present over a thousand children are brought annually to this clinic for diagnosis and help.

Following this precedent, many other departments of psychology and education in universities have established clinics. More recently they have been developed by public school administrators as a part of the system of public education. Some of the better known of these are the Psycho-Educational Clinic in Newark, the Department of Child Study in Chicago, the Psycho-Educational Clinic in St. Louis, the Psychological Clinics in Oakland, Los Angeles, and Cleveland, and the Vocation Bureau in Cincinnati.

"Mental clinics for the diagnosis of feeble-mindedness

should be established in large centers of population to serve the entire state. All large cities should have a mental clinic as part of the public school system. Rural communities and small towns could be served by a traveling clinic, as a part of the state government. This clinical group, or even a single clinician, could examine the backward children over a very large area. A visit to each small town once a year would be sufficient. Other defectives would be recognized and reported by physicians, court and jail officials, social workers, town officials, and others. Every school for the feeble-minded should conduct out-patient clinics at the institution, and in various cities and towns served by the school.

"At the time of the mental examination the parents could be informed as to the mental condition of the child, and of his need for special training and protection." [1]

The Need for Expert Diagnosis.—The purpose of the clinic is individual diagnosis, and to do this correctly is a difficult task, requiring a highly competent and trained person. Enough has been said about feeble-mindedness to indicate that it is an infinitely complex problem, and not an entity to be treated in a routine way. Unfortunately, this latter notion has been all too prevalent in the past. Many of the so-called "experts" on feeble-mindedness, in the schools, courts, and clinics, have been young graduates from normal schools who have "taken a course" in mental measurements; grade teachers with subnormal children, who have learned to give "tests"; social workers who have spent some time in an institution, and who can work by thumb-of-rule with the Binet-Simon scale; or physicians with some incidental neurological interests. The assumption underlying their procedure has been that measuring scales have been perfected which enable us to locate with accuracy the "mental age" of people, even down to months of a year; that the upper age limit of feeble-mindedness has been determined at a precise point in mental development; and that feeble-mindedness can be

[1] FERNALD, W. E., "The Feeble-minded in the Community," in *Social Aspects of Mental Hygiene*, Yale University Press, New Haven, 1925, p. 117.

identified by arbitrary or fixed quantitative units of intelligence retardation.

As a matter of fact, it is not possible in a large number of cases of both adults and children to make accurate and adequate mental diagnoses by a mechanical use of existing tests. A test is but a stimulus eliciting a performance—a cross section of behavior, as it were—which requires scientific interpretation by the examiner if it is to be of value for diagnostic purposes. "The function of tests in clinical psychology is the same as the function of tests in medicine. They are standardized tools by means of which the trained psychologist or trained physician may work more skillfully. They enable him to observe under controlled, standardized, objective conditions; they render his results comparable with the observation of others, and make it possible for him to interpret his findings in terms of normal functioning when the norms are available. Even the best tests in psychology, however, should be regarded merely as aids to assist the examining psychologist to a guarded diagnosis."[1]

The identification of existing cases of mental deficiency is highly desirable, but it cannot be achieved by a short cut or in a wholesale manner. Individual examination by clinical psychologists, scientifically trained and competent to analyze the performance of the individual, is a slow and expensive method, but only in this way may the first step in a rational program be achieved.

2. *Registration*

"All recognized defectives should be registered; this official census would give a logical basis for intelligent management of all the mentally defectives of the state.

"No doubtful case should be registered: only those persons whose mental defect has been scientifically diagnosed. This register should be highly confidential and accessible only to properly accredited persons. An official census of the feeble-minded of the state, with histories and records of all uncared-for feeble-minded persons in the state, would show the families

[1] WALLIN, *op. cit.*, p. 272.

and individuals most likely to transmit defect, and most needing segregation, especially if extra-institutional observation and supervision of all these persons is also authorized. The information which this plan would make available would permit the selection of the people for segregation who most need segregation. This coördination of existing records would be available for social workers, school authorities, and other agencies, and would be of enormous service in the solution of the individual problems which the feeble-minded constantly present." [1]

3. Special Classes in the Schools

All mentally defective children should be segregated in special classes as soon as they can be indubitably diagnosed, and should be provided with that kind of training which will develop maximally those aptitudes and capacities which they possess. The responsibility of the public school as an agency charged with the task of educating all the children of the community is clear. The training of mental defectives is an educational problem as truly as that of normal children, and the duty of the school to provide training for the defective child according to its capabilities is just as great as for the normal and exceptional children in accordance with their capacities. All that differs is the kind of training required.

The first special classes for backward children were established in the public schools of Cleveland about 1880. Since then this movement has developed gradually, until today most of the larger cities and towns have instituted such classes, with carefully formulated courses of study. Such provisions should be extended to smaller centers of population. "Cities and towns of over five thousand population are likely to have groups of at least ten or more defective children. Such communities should be required to establish special classes for defective children. The proper authorities should decide upon the courses of study and the equipment of school materials which are necessary for these special school classes. Provi-

[1] FERNALD, *op. cit.*, pp. 117-118.

sions should be made in the normal schools for training teachers of defective children. Every normal training school for teachers should be required to give suitable instruction to teachers to enable them to recognize probable cases of mental defect and to give them a general idea as to the training and discipline of such children." [1]

The fundamental weakness in the organization of these special classes has been the lack of definiteness in the selection of candidates for them, thus again emphasizing the necessity of facilities and personnel for careful diagnostic work. "While it seems clear that the special classes started in the United States were inaugurated specifically for the training of the feeble-minded, it is perfectly obvious to any one who has carefully inspected the work in many cities that our practice has failed to square with our theory, and that there is considerable confusion in respect to the organization and management of special classes. In some cities the special classes are made the dumping ground for all kinds of pedagogical misfits and social ne'er-do-wells: mentally normal children who are pedagogically retarded; mentally or pedagogically backward pupils; morons, imbeciles, high-grade idiots, moral imbeciles, truant or unruly children; children of good mentality, but suffering from sensory deprivation (semi-blind, semi-deaf and word blind); crippled or paralytic or speech-defective children who are not feeble-minded; foreign children of good mentality whose defect is primarily linguistic. There may be some excuse for throwing together in one class such a heterogeneous mass of children as this in a small system, where only one class can be organized, but there is no excuse for such a situation in a large school system." [2]

Workers with feeble-minded children have come to think of many of them not so much as defective as merely "differently minded" or "hand-minded." Accordingly, it is in the direction of industrial and manual training that special class instruction increasingly tends, for it is along mechanical and

[1] FERNALD, "A State Program," *op. cit.*, p. 5.
[2] WALLIN, *op. cit.*, p. 64.

practical lines that they frequently reveal ability, and sometimes unusual ability. The objectives of the special class have been ably set forth by Dr. Maxfield, director of the Pennsylvania Bureau of Special Education. His summary of these objectives is as follows:

1. *An adapted curriculum.* Trained teachers in well equipped rooms, by modifying the standard curriculum, give these children an opportunity that is not possible in the regular grades.
2. *Mental analysis.* A thorough analysis of each child must be made. Physical condition, family history, and home background, as well as differences in intelligence, personality, and emotional stability, must be considered. Teaching must continue this diagnostic process.
3. *Health education.* The development of physique and of health habits is both possible and desirable.
4. *Mental hygiene.* Mental as well as physical hygiene can be corrective and preventive. Emotional stability and normal social reactions in simple life situations should be sought.
5. *Prevocational training.* Much of the academic work of the standard curriculum should be replaced by industrial and household arts. This work is prevocational rather than vocational.
6. *Guidance and supervision.* Responsibility for the mental defective should not cease when he leaves school at sixteen.
7. *Conformity.* Well behaved boys and girls with courteous manners and clear speech are less conspicuous than others, and more likely to succeed.
8. *Influence on school organization and method.* The special class can and should influence the organization and method of all elementary-school work by emphasizing the fact that schools are made for children and not children for schools."[1]

Where the project of special and adapted training for mentally defective school children has been tried fairly, the results have been surprisingly satisfactory.[2] Such results emphasize the truth of the judgment that "feeble-minded children are peculiarly creatures of habit. If good habits can be ingrained in early childhood, they may become law-abiding citizens. If bad habits are ingrained, it is almost impossible to change them. The hopeful feature of the situation is that

[1] MAXFIELD, FRANCIS N., "Objectives for the Special Class in the Public Schools," *Fifty-first Annual Report, National Conference of Social Work*, The University of Chicago Press, Chicago, 1924, p. 474.

[2] FARRELL, E. E., in *The Sixteenth Annual Report, Superintendent of Schools*, New York City, 1913-14, and WOOLLEY, HELEN T., and HART, HORNELL, "Feeble-minded Ex-School Children," *Studies from the Helen S. Trounstine Foundation*, Vol. I, No. 7, Cincinnati, 1921.

it is almost as hard to change the good as the bad habits in adult years."[1]

In a study of the special class facilities for mentally deficient children made for the school year 1922-3 by the National Committee for Mental Hygiene, there were reported 45,179 pupils enrolled in 2,492 special classes. These were reported from 430 different cities and school districts in thirty-seven states and the District of Columbia. Comparing these figures with those of the Bureau of Education, Department of the Interior, for 1913, there appears an increase of 483 per cent in the number of pupils and 425 per cent in the number of teachers for the decade included.[2]

Present indications are that before many years the public school will be so organized to deal with defective children that it will become the largest and most important single agency devoted to the work of developing the feeble-minded for economic and social usefulness.

"The great majority of mental defectives are of the moron group. If the plan suggested for the early recognition and the intelligent education and training of the moron in public schools and at home is carried out, many of this class can be cared for safely at home. We have begun to recognize the fact that there are good morons and bad morons, and that it is often possible in early life to recognize the moron with anti-social and criminalistic tendencies, who will probably need institutional care. Morons from families unable properly to protect and control their children will need institutional training and care. The fact should be emphasized that the neglected moron is the defective who makes trouble later in life, and that during the formative period of his life he should receive proper care and training either at home, with the special help of the regular teacher of the special class, or in an institution school."[3]

[1] Woolley and Hart, *op. cit.*, p. 260.

[2] Haines, T. H., "Special Classes for Mentally Handicapped Children in the United States," *Fifty-First Annual Report, National Conference of Social Work,* The University Press, Chicago, 1924, pp. 464-470. This article gives an excellent brief account of the development and status of the movement.

[3] Fernald, "A State Program," *op. cit.*, p. 5.

4. Supervision

The identification and registration of all cases of feeble-mindedness would make possible another important step in a rational program: that of the general supervision, assistance, and control of the uncared-for feeble-minded of the state who do not need immediate institutional commitment. Fernald suggests that such supervision should be under the direction of a State Board of Control, or some similar body, whose head would be a psychiatrist with a special knowledge of mental deficiency and its social manifestations.

"The local administration of this supervision could be carried out by the use of local public organizations, existing local private organizations and societies, or by properly qualified volunteers in each community. This systematic supervision of the feeble-minded could easily be made to cover the entire state, with a local representative in each community, but all under the direction of the central authority.

"Each defective could be regularly visited and kept under observation by the local visitor. The reports of these visitors, covering the life histories and the family histories of many cases, would soon constitute an invaluable treasury of information as a basis for scientific research and study in the search for practical methods of prevention. . . .

"The registration of every feeble-minded person, and the regular visitations, especially of children of school age, would make it possible to inform the parents of the condition of the child, of the necessity of lifelong supervision, and of the possible need for future segregation. Suitable, tactful literature should be prepared, which could be gradually presented to the parents in a way that would have great educational value. . . .

"The local representatives of the central bureau would officially serve as advisers and sponsors for pupils graduated from the special school classes, for court cases under probation and observation, and for institutional inmates at home on visit or trial. Thus there would be a person in every

locality familiar with the opportunities for mental examination and methods of permanent commitment. . . ." [1]

5. Institutional Care

The majority of idiots and imbeciles, those found in the special school classes to be markedly anti-social and immoral, together with the failures in the program thus far outlined, will need institutional care.

The institution, as a part of the general program being outlined, ceases to be like a still lake which receives a slow influx of new waters and loses its contents by slow evaporation, such as was the older conception of its function, and becomes more like a lake fed and drained by a running stream. It should be, first, a selective agency, identifying those giving indications of possessing personality traits socially acceptable and useful; and, second, an educational agency, for their training and socialization.

6, 7. Colonization and Parole

Colonization and parole, as indicated previously in this chapter, are the next steps for those responding favorably and satisfactorily to training, each enlarging the environment of the particular individual with the reward of a greater freedom.

8. Segregation

Segregation will be, of course, the inevitable end of all those who do not respond to, or who fail in the course of, these successive stages in the policy of socialized training.

However the details of the program may be worked out, the principles underlying it are contained in the following paragraph, almost the last written words of the man who has had a wider influence in shaping the policies for the care and training of mental defectives than any one other.

"All of our experience in dealing with the feeble-minded indicates that if we are to manage the individual defective successfully we must recognize his condition while he is a

[1] FERNALD, in *Social Aspects of Mental Hygiene*, op cit., pp. 120-121.

child, and protect him from evil influences, train and educate him according to his capacity, make him industrially efficient, teach him to acquire correct habits of living, and, when he has reached adult life, continue to give him the friendly help and guidance he needs. If conditions are right, he may live at home and receive his training in the rural school or in the special class. If he is actually a social menace, he will need the institution. These advantages should be accessible to every feeble minded person in the state, and not to a few favored persons. The rights of the feeble-minded person and of his family should be jealously guarded, as well as the rights of society." [1]

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CHAPTER XXIV

MENTAL DISEASES AND THEIR SOCIAL SIGNIFICANCE

That there are diseases and disorders of the mind and nervous system, just as there are of the kidneys, heart, and circulatory system, is so obvious that it is difficult to see why recognition of the fact should have been so long delayed.

Because the mind was conceived to be a distinct and separate entity, apart from the body and beyond the ken of human understanding, mental disorders were attributed for centuries to machinations of devils, the operation of the moon, and other supernatural factors.

Rather recently, but still only in part, has the veil of superstition been lifted. Even today "there is probably no group of diseases about which there is such widespread popular ignorance or misinformation as those that affect the mind. People who would be ashamed not to have accurate information regarding the more important infectious diseases and more than general knowledge of the means by which they are transmitted speak of 'insanity' as if there were a single disorder to which that name could properly be applied, and are without the slightest knowledge of the different forms of mental diseases, the periods of life in which they appear, their main characteristics, and the means by which they terminate." [1]

There is the greatest need for a book simply written in understandable terms on mental diseases. In the chapters devoted to this subject here, the most that can be attempted is to point out a few pertinent and fundamental facts, in the hope of stimulating an interest which will lead to further study.

[1] Salmon, Thomas W., in May, James V., *Mental Diseases*, Richard G. Badger, Boston, 1922, p. 6.

INSANITY AND MENTAL DISEASES

Disorders of conduct, resulting from mental disease and of a degree or kind considered intolerable in the community, have been designated historically as insanity; and persons thus afflicted have been referred to, both in current speech and by the law, as insane.

The essential fact about conduct which labels it as insane is its departure from customary forms, and as indicating a lessened capacity for adaptation to environment. To ride down the center of the street, shooting and yelling the while, may be considered normal conduct in a frontier community, nobody thinking it strange or attempting to interfere with it. A similar performance on Fifth Avenue, New York City, would be regarded in a somewhat different light.

The term "insanity," then, does not refer primarily to mental diseases, but to conduct; it should not be used, therefore, as a medical term at all. "It is solely a legal and sociological concept and so used to designate those members of the community who are so far from able to adjust to the ordinary social requirements that the community segregates them (forcibly, perhaps) and takes away their rights as citizens. Insanity is a form of social inadequacy which medically may be the result of many varieties of mental disease. Insane, therefore, means nothing more than certifiable." [1]

While insanity is the result of mental disease, the two terms are not interchangeable. All insane persons are theoretically mentally ill, but it by no means follows that all the mentally ill are insane within any accepted meaning of the word. Mental illness is a broad term which includes many members of the community not legally or socially classified as insane.

Although out of favor in present scientific discussions because of long-continued and loose usage and because its roots go back to the period of supernatural interpretation, Dr. William White has emphasized the advantages of retaining the term "insane," with its restriction, however, to that group of

[1] White, William A., *Outlines of Psychiatry*, Nervous and Mental Disease Publishing Company, Washington, 1923, p. 27.

persons who suffer from civic disabilities because of legal proceedings necessitated by mental diseases.

Nor is the term "mental disease" above reproach. There are many distinct groups of mental disease having biologically less relationship to one another, except for two groups, than to certain diseases of the body. We must discard the idea that psychiatry deals with mind disease, "for there is no theory of separation of the organism into mind and body which has a medical-biological reason for existing. Mind is not even at all a brain function; it is a function of the entire organism and has its roots in the viscera, the endocrinal glands, the vegetative nervous system, and even in the muscles and joints. Mood is a matter as much of intestines as of brain, emotions are possibly more related to viscera and to endocrines than to cerebrum, and vigor, out of which springs hope, courage, clearness of thought, and pertinacity of attention, is a matter of fatigue, health, age, arteries, etc. Desire has one of its origins in alteration of the body tissue and there are innumerable instances of character change, personality alteration, mind metamorphoses, that are clearly somatic in their causation. . . .

"So when we use the term 'mental diseases' we are using a convenient method of expression which denotes that the striking symptoms are mental changes, though there may be and often are as important changes in the organs and tissues of any part of the body, and the cause may be, and in some cases is, disease of non-nervous parts whose well-being is essential to proper mental functioning." [1]

EXTENT OF THE PROBLEM

1. The Number of Hospital Cases

On January 1, 1923, there were 267,617 patients with mental diseases in hospitals for their care in this country. The total number on the books of these institutions on that date, including those on parole and subject in other ways to their supervision, together with the patients in psychopathic wards

[1] MYERSON, ABRAHAM, *The Inheritance of Mental Diseases*, Williams and Wilkins Company, Baltimore, 1925, pp. 16-17.

of general hospitals, was 292,299.[1] This number approximates the population (1920) of Rochester, New York, the twenty-third city in size in the United States. It is equivalent to about 70 per cent of the total enrollment in the colleges and universities of the country, despite the phenomenal increase of the latter in recent years. In order that the magnitude of the problem be fully realized, it should be added that more hospital beds are devoted to the care of the mentally afflicted than to all other classes of sick patients combined.

This large number by no means includes all persons with mental diseases in obvious need of hospital treatment, since the facilities in many states are grossly inadequate. The ratio of persons with mental diseases to the general population is about the same in different parts of the country. If all states made provisions to the extent that New York and Massachusetts do, the number of patients on January 1, 1923, would have been in excess of 400,000.

Another index to the extent of the problems of hospital cases is the number of first admissions. It has been customary in recent years to place the annual total at 50,000. The recent federal census, the first one to separate first admissions from the others, reveals that this estimate has been too low, and that in 1922 there were 73,063 persons who entered hospitals for the mentally diseased for the first time.

2. Is Mental Disease on the Increase?

The number of persons cared for in institutions for mental disease has increased from 40,942 in 1880 to 267,617 in 1923—from 81.6 per 100,000 of the general population in 1880 to 241.8 in 1923, as shown in the following table:

Do these figures mean, as is stated frequently in popular literature on the subject, that the number of mentally diseased persons has been increasing three times as rapidly as the population?

A number of circumstances suggest that the increase is far less than the foregoing table indicates, even raising the

[1] Preliminary statement, released to the press, July 14, 1924, *Department of Commerce*, Washington.

TABLE I

Year	Number	Per 100,000 of the general population
1880	40,942	81.6
1890	74,028	118.2
1904	150,151	183.6
1910	187,791	204.2
1917	232,873	226.5
1918	239,820	229.6
1923	267,617	241.8

question whether there has been an increase at all. Popular education to the hospital rather than the custodial features of institutions for the mentally diseased has resulted in the last four decades in an increasing readiness to accept their services. The raising of standards of care in the hospitals has meant a lower rate of elimination through death, with a resultant accumulation of institutional population. The prolongation of human life in general has meant that more people survive to the age when mental disease manifests itself. Many cases which formerly would have been found in almshouses, prisons, and reformatories are now in hospitals for their special care. Most important, however, is the increase in specialized institutions for their care. Thus far, not a single state in the Union has made adequate provisions for the treatment of mental and nervous patients. Everywhere there are overcrowding and delay because of lack of hospital beds. In many states conditions beggar description. Manifestly, then, the increase in the number of persons in institutions, as shown above, is more of an index of progress in the development of facilities for their care than of the amount of mental disease actually existing. How much allowance is to be made for these factors, and to what extent mental diseases have increased, if at all, it is not possible to say on the basis of information now available.

3. Larger Aspects of the Problem

A further fact to be considered is that the problem of mental disease is a much larger one than that of the institutional population. "Today we know that there are far more non-asylum cases of mental disease than there are of those

needing asylum care. Not only is this true when we consider only the diseases which are often committed to state hospitals, but it becomes completely incontrovertible when we include in the mental diseases the innumerable cases of character defect, neurasthenia, hysteria, etc. In other words, the problems of mental disease reach into almost every home, and very certainly into every workshop, school, church, and jail, and are part of the problem underlying such great social phenomena as poverty, crime, social conflict, religion, and prostitution." [1]

Once the concept of mental disease is fully grasped, it becomes clear that there are all sorts and conditions of persons between those with perfect health on the one hand and those with a complete lack of it, as reflected in the chronic insane, on the other. Few, if any of us, are in possession of the former. Wherein we differ is in the degree to which we lack it.

The mental disorders of many persons undoubtedly are mild, for "mental disorders may be mild, just as physical disorders may be; mental indigestion may be of as many degrees as physical indigestion, and an emotional disturbance may be as mild as an attack of chicken-pox." [2]

The extent of our problem at any one time depends, then, in part at least, upon where the line of social concern is drawn, —*i. e.*, where eccentricity ends and where "insanity" begins. Abraham Radinsky, who is pronounced "insane" in Chicago, might never be considered more than peculiar in the simple rural community in Poland from which he hails. Here, again, is involved the question of the standard which society recognizes at a particular time and place.

Appreciation of the larger aspects of the problem of mental disease and disorder is a recent development, and their existence is being revealed in unexpected places. It is a motley group which we find thus afflicted. "It includes respectable bankers peevish with their wives; scrupulous housewives with immaculate and uncomfortable homes; children with night-terrors and all sorts of wayward reactions; earnest reform-

[1] Myerson, *op cit.*, p. 24.

[2] Campbell, Charles, *A Present-day Conception of Mental Disorders*, Harvard University Press, Cambridge, 1924, p. 16.

ers, intellectuals, esthetes; delicate and refined invalids, evasive and tyrannical, with manifold symptoms and transitory dramatic episodes; patients delirious with fever, or reduced by a great variety of organic diseases; patients frozen with melancholy or indulging in an orgy of exuberant activity; patients living in a fantastic world with morbid visions and communications and uncanny influences, in whose universe one sees no coherence or logical structure; patients keenly logical and argumentative, embittered, and seeing around them a hostile world with which they refuse to compromise.[1]

SOME SYMPTOMS OF MENTAL DISEASE

A complete and systematic description of the symptoms characterizing the manifold varieties of mental disease is manifestly impossible within the limits of this volume, and for this the reader is referred to any reputable manual on psychiatry.[2] A brief summary of the more prominent manifestations will suffice to give an idea of the phenomena and argot of psychiatry.

Hallucinations may be defined as false sense impressions. "The patient sees an object which has no real existence, or hears an imaginary voice. Hallucinations are termed visual, auditory, tactile, etc., according to the sense to which the false impression appears to belong. Auditory hallucinations are particularly common. The 'voices' may make remarks of either a pleasant or unpleasant character, but generally they refer to subjects closely related to the patient's most intimate life, and often they consist of some abusive comment or reproach reiterated with stereotyped persistence. Thus a patient may hear a voice constantly announcing that on account of the sins he has committed he will shortly be put to death."[3]

[1] CAMPBELL, *op. cit.*, pp. 25-26.

[2] The reader will find an excellent summary of the symptoms most frequently found in Chap. III of Hart's *Psychology of Insanity*, third edition, 1916. More comprehensive discussions will be found in Kraepelin, E., *Psychiatrie*, eighth edition; DIEFENDORF, A. R., *Clinical Psychiatry*, 1918; WHITE, W. A., *Outlines of Psychiatry*, ninth edition, 1923; BOWERS, P. E., *Manual of Psychiatry*, 1924.

[3] HART, BERNARD, *The Psychology of Insanity*, Cambridge University Press, Cambridge, third edition, 1916, p. 30.

Delusions are false beliefs. Many such beliefs are current among the "sane" in the community, but the term here means beliefs retained in spite of the most convincing demonstration of their falsity. "Delusions are divided into various groups, the most important being delusions of grandeur in which the patient imagines himself to be some high personage, even reaching the climax of absurdity in believing himself to be God; delusions of self-depreciation in which the reverse trend is noted, the patient believing himself to be the lowest of the low and accusing himself of all manner of crime; delusions of reference in which the patient believes that people talk about him in a way not at all likely to have occurred, that strangers notice him and point him out to one another wherever he goes; delusions of persecution which are exemplified in the idea that the Masons or Catholics or non-organized groups of persons are endeavoring to hurt or injure him in some extraordinary and unlikely fashion; somatic delusions in which the patient may believe that he has no bowels or no heart . . .; delusions of jealousy . . .; nihilistic delusions —here the victim states that nothing exists. . . ." [1]

Illusions are perverted perceptions. The information conveyed to the mind by the sense organs is misinterpreted, so that the source of the sensory stimulation is not appreciated at its true value. A cane on the floor becomes a snake. A peculiar taste is thought to be poison. A person near by is declared to be a ghost.

Obsessions are persistent ideas, emotions, impulses, which come into consciousness, over which the patient has no control, and which he or she often comprehends at their true value. The milder forms of obsessions are quite common in so-called normal persons.

The commonest and best known of the obsessions are the phobias or fears. These are usually very specific, such as fear of cancer, fear of dirt, fear of narrow or closed spaces, fear of metals, etc. Obsessions of doubt are also frequent, arising about the simplest acts of everyday life. A very common illustration is the case of a person who, upon retiring,

[1] MYERSON, *op. cit.*, pp. 19-20.

is seized with doubt as to whether the door is locked, is forced to get up and go and see, only to be seized again by the same doubt when he returns to bed. Another form is the constant repetition of some needless and useless action such as the "washing mania," in which the patient is driven to wash his hands at almost every moment of the day.

Flight of Ideas.—When this condition obtains, the patient's mind works in an irrelevant manner. The goal of the thought processes becomes lost because there are so many other ideas constantly rushing into consciousness, "all seeking for expression, but none gaining the mastery." Marked distractibility is frequent, but time reactions are abnormally slow.

Circumstantiality differs from the preceding in that the goal idea is maintained and finally reached, although there are numerous digressions with much unimportant detail. This condition is often found in a moderately developed form and has no special significance other than showing a lack of appreciation of the relative value of ideas.

Exaltation, Depression and Apathy are the main forms of emotional disturbances, so frequently found among the symptoms of mental disease. Similar phenomena occur in normal mental life, but they assume pathological significance when manifested to an exaggerated degree.

Exaltation implies a state of happiness not warranted by the condition of the patient or his surroundings. It is usually combined with increased psychomotor activity, and not infrequently with a marked degree of irritability. *Depression* is the opposite state. It is hopelessness exaggerated often beyond belief. Often there is anxiety, with difficulty of breathing and great motor agitation. *Apathy* in psychiatry means a pathological condition in which the emotions fail to respond to stimuli which in health would arouse a reaction. The patient is completely inert. The external world consists for him of trivialities unworthy the expenditure of mental energy. This condition is common in dementia præcox in the so-called "bench-type," where the patient is curled up on or under a bench and drools his days away, apparently hearing or seeing nothing.

Psychomotor activity may be either increased or decreased. The former manifests itself in marked restlessness, constant activity, tireless hurrying about, but usually without purpose or definite accomplishment. Or there may be the opposite condition, with a marked slowness in the liberation of voluntary motor responses.

Stereotypy is a curious phenomenon most frequently found in chronic cases of long duration. "The patient carries out some action with monotonous repetition and regularity day in and day out. Often all his mental energy is absorbed in this performance, so that from one year's end to another he seems to have no other interest, desire, or ambition. These stereotyped actions may be of all kinds and of all degrees of complexity, ranging from a simple rhythmical movement of the hands or head to elaborate procedures suggesting the manipulations of a skilled tradesman who is plying his craft. Sometimes, again, a phrase or sentence is repeated over and over with the same monotonous persistence. Thus, one of my patients has for years devoted his entire waking existence to reciting the phrase, 'It's all wrong, I tell you.'" [1]

GROUPS OF MENTAL DISEASES

Mental disorders have been classified upon etiological, psychological, pathological, and clinical bases. None of these can be complete or strictly accurate for all mental diseases. Correct and comprehensive classification depends upon proven and irrefutable knowledge of all four of these aspects. No such knowledge is available at the present time. Any attempt at classification, therefore, must be considered merely as an index of our existing understanding of the problems involved.

The oldest and most popular method of classifying diseases has been upon the basis of clinical findings. The symptoms of mental disorders tend to arrange themselves into groups, which are found to be more or less constant, and to occur with some regularity whenever certain etiological factors are present. Such groups come in time to acquire definite labels,

[1] HART, *op. cit.*, p. 35.

and serve to arrange the phenomena of psychiatry in a definite and orderly manner.

"These groups, the so-called clinical types, are not clean-cut entities, but are only groups of symptoms which either seem to occur more frequently in combination or else have been more definitely and clearly seen because of the nature of that combination. In fact, classical types as such may be said to be in the minority. The great mass of cases seen are combinations more or less intermediate in character. The conception of types in order to be accurate must be from a broad biological viewpoint. Types are like species. They have innumerable transition and intermediate forms." [1]

In fact, "the present tendency is to get away from classifications in the old sense of applying names to groups of symptoms—that is, in the sense of considering each psychosis as a more or less static entity to which a descriptive term is given." [2] "The important thing is an understanding of the patient, not a labeling of the psychosis. To this end a comprehension of the character make-up, the nature of the etiological factors and accessory conditioning factors, and the mechanism of the reaction must be known. So much at least must we know, and then, whether we give one name or another to our resulting conception, or no name at all, matters little." [3]

The following classification is from the third edition (1923) of the *statistical manual,* published by the National Committee for Mental Hygiene. Although it has defects, it takes into account all of the psychoses which are encountered; it is commonly employed by psychiatrists, and is being used by all the more progressive institutions in this country. The explanatory notes, unless otherwise noted, are taken largely from those prepared for the manual by Dr. George H. Kirby, Director, Psychiatric Institute, Ward's Island, New York City.

1. *Traumatic Psychoses* are mental disorders arising as a direct and obvious consequence of a brain or head injury

[1] WHITE, *op. cit.*, p. 26.
[2] *Ibid.*, p. 30.
[3] *Ibid.*, pp. 29-30.

producing psychotic symptoms of a fairly characteristic kind. The percentage of such cases apparently is negligible.

2. *Senile Psychoses* are psychoses which develop gradually in, and are perhaps due to, old age. It is still undetermined what proportion of cases so referred to are dependent upon recognizable senile changes and what to mental diseases occurring in old age. Nevertheless, there is a well-defined group of psychoses to which the term senile is applied, characterized by the following symptoms: Impairment of retention (forgetfulness) and general failure of memory more marked for recent experiences; defects in orientation and a general reduction of mental capacity; the attention, concentration, and thinking processes are interfered with; there is self-centering of interests, often irritability and stubborn opposition; a tendency to reminiscences and fabrications. Accompanying this deterioration there may occur paranoid trends, depressions, confused states, etc

3. *Psychoses with Cerebral Arteriosclerosis.*—While increasing importance is being attached in recent years to cerebral arteriosclerosis as a complicating factor in many of the generally recognized psychoses, clinical differentiation of a purely arteriosclerotic psychosis is not very well established. The diagnosis appears justified when "mental deterioration coexists with evidence of general (headache, dizziness, fainting attacks, etc.) and more particularly focal (aphasia, paralysis, etc.) brain damage." [1]

4. *General Paralysis, or Paresis,* is the most clearly differentiated and sharply circumscribed of the psychoses. Its history, like its pathology, is inseparable from that of syphilis. Clinically this disease is marked by an extensive range of symptoms. Early in the disease occur changes in disposition and character, defects of judgment, difficulty about time relations, unreliability, extravagance, and forgetfulness. At the height of the disease and in its final stages there is deep dementia with delusion trends of grandeur.

A juvenile form of paresis was identified by Clouston in

[1] Strecker, Edward A., and Ebaugh, Franklin G., *Clinical Psychiatry,* P. Blakiston's Sons & Co., Philadelphia, 1925, p. 19.

1877. The symptoms usually appear at or shortly before the age of puberty, although mental defect may exist from birth. Such cases show a distinct motor inability and a superficial verbalism "similar to the genial verbosity of the paretic himself, yet it has in it more of the fatigue hyper-excitability of a manic-depressive or excited phase." [1]

5. *Psychoses with Cerebral Syphilis.*—As now used, this term includes all syphilitic involvements of the brain other than general paresis. In all forms of cerebral syphilis the psychotic manifestations are less prominent than in paresis and the personality is much better preserved, as shown by the social reactions, ethical sense, judgment and general behavior. The grandiose ideas and absurd trends of the paretic are rarely encountered.

6. *Psychoses with Huntington's Chorea.*—This disease is hereditary in origin, occurs in adult life, and is associated with mental inertia, either apathy or silliness, or a tendency to passionate outbursts.

7. *Psychoses with Brain Tumor* are more common than is generally supposed. The mental symptoms are not clear cut. There may be dullness, somnolence, hebetude, slowness in thinking, memory failure, irritability, depression, confusion with hallucinations, suspicions, and paranoid trends.

8. *Psychoses with Other Brain and Nervous Diseases.*—Herein are included a number of conditions, including *Encephalitis lethargica,* or sleeping sickness. The diagnosis in these groups rests largely upon the identification of the neurological disease.

9. *Alcoholic Psychoses* include those mental disorders arising, with few exceptions, in connection with chronic drinking. Of the more frequently found clinical types are: (a) delirium tremens—a delirium with tremor, toxic symptoms, and a prominent hallucinatory content; (b) acute hallucinosis—chiefly an auditory hallucination of rapid development, with marked fears and a persecutory trend; (c) paranoid types,

[1] Mateer, Florence, *The Unstable Child,* D. Appleton & Company, New York, 1924, p. 392.

which may be acute or chronic, and showing persecutory ideas and jealousy trends.

10. *Psychoses Due to Drugs and Other Exogenous Toxins.*—"Here we have to deal principally with deliria and confused states, although hallucinatory and paranoid reactions may be encountered. The toxic etiological factor may be opium and its derivatives, cocaine, bromides, chloral, veronal, luminal, lead, arsenic, gases, etc." [1]

11. *Psychoses with Pellagra.*—The relation which various mental disturbances bear to pellagra is not yet settled. Those apparently most intimately connected with the disease are certain delirious and confused states, arising during the course of a severe pellagra.

12. *Psychoses with Other Somatic Diseases.*—Under this heading are brought together the various mental disorders which appear to depend directly upon some physical disturbance or somatic disease and not otherwise classified. The clinical pictures met with are extremely varied, for the psychotic symptoms depend directly on the influence of somatic disease, either because of interference with brain nutrition or because of the unfavorable action of poisons or toxins upon the central nervous system. Deliria or confused states are most generally found, usually with marked motor excitement, incoherence, hallucinations, and clouding of the consciousness.

13. *Manic-Depressive Psychoses.*[2]—This very common disorder is characterized clinically by two main features:

(a) It is periodic, occurs and recurs, has periods of normality interspersed between attacks, and tends only slightly toward dementia. Its recurrence is illustrated by the fact that about one-third of readmissions into mental hospitals fall into this group. It is interesting to note, too, that although there is an almost complete lack of mental functioning during an attack, in recovery the return is entirely, or almost, to the normal.

(b) There is a change in mood, taking one of two direc-

[1] Strecker and Ebaugh, *op. cit.*, p. 21.

[2] The description of this disease is taken largely from Myerson, *op. cit.*, pp. 94-97.

tions. Either there is a depression or melancholy, called the depressive phase, or an excited, joyful, exalted mood, called the manic phase. There is also a mixed form, combining these two phases, and a circular form, in which they alternate.

There are many mild forms of this psychosis. In such cases the depressed phase takes the form of a simple but intense sadness, a state in which pleasure departs from all things and all relationships, with sluggish thought, lowered energy, and a tendency to solitude. To the casual observer this may appear as a prolonged case of "the blues." The manic phase in its milder forms may be a mere exalted state, with talkativeness, increased activity, restlessness, increased sex desire, and often impractical zeal which gets the patient into all kinds of trouble. These milder cases are not regarded as "insane." Such cases are very common and, as is true of the more advanced forms, are apt to be manifested before the twenty-fifth year. They also appear to be more frequently found among women than among men.

14. *Involution Melancholia.*—To be included here are the depressions of middle life and later years, following the menopause in women and starting in the late forties or early fifties in men. They come on gradually and have a prolonged course. The chief manifestations are worry, insomnia, uneasiness, anxiety, agitation, ideas of unreality, but with little or no evidence of difficulty in thinking.

15. *Dementia Præcox* is the most common of the mental diseases and undoubtedly the most difficult to comprehend. Despite the numerous theories which have been advanced, it is essentially the disease described by Kraepelin in 1899.[1]

This disease generally starts early in life, usually during the period of puberty and adolescence, and, in the majority of cases, there is a progressive mental deterioration.

Unlike manic-depressive psychoses, "it has no counterpart or miniature in normal (average) behavior. To the observer it presents a grotesque, bizarre, inexplicable and unnatural appearance. The mental processes are not only utterly different from anything observed in the mental life of the aver-

[1] KRAEPELIN, E., *Dementia Præcox,* 1919.

age individual, but, furthermore, are not in keeping with one another, and, in fact, are constantly working at cross purposes. They appear to functionate not only pathologically, but also independently." [1]

The features which generally characterize dementia præcox are (1) seclusive make-up; (2) defects of interest; (3) discrepancies between thought, behavior, and emotional reaction; (4) emotional blunting, indifference, silliness; (5) defects of judgment; (6) hypochondriacal notions; (7) suspiciousness and ideas of reference; (8) odd, impulsive, negativistic conduct, usually without relation to emotional disturbance; (9) autistic (dream or fantasy) thinking, dream-like ideas, feelings of being forced or of interference with the mind from the outside, physical and mythical influences.

Myerson thus describes the chief types of dementia præcox. "One goes into a ward—one sees a patient stalking haughtily to and fro, muttering to himself, eying his neighbors with suspicion and disdain, or smiling with unconcern for those around him. Questioned, one finds that he believes that everyone talks against him, that his rooms are filled with gases, his food is poisoned by monkeys in the employ of vaguely identified people, that he hears and sees queer things of all kinds, that he believes himself in a vague way to be some great personage, and is beginning to be confused and deteriorated. His language, vague and difficult to follow, is filled with symbolisms and neologisms intelligible only to himself—a paranoid dementia præcox.

"Or one sees in a corner a patient, standing with head down, and limbs in a grotesque attitude. He does not answer when addressed, but resists violently if any effort is made to change his position, or perhaps retains any position, no matter how grotesque, into which he is placed, a catatonic dementia præcox.

"On a bench in a ward is a curled-up figure, lying motionless, like a bag of meal, taking no interest whatever in what goes on, drooling saliva, wetting and soiling himself, eating if he

[1] Strecker and Ebaugh, *op. cit.*, pp. 25-26.

is fed, and sleeping if he is put to bed—in a word, vegetating—a hebephrenic.

"In the fields of the hospital, in the barn, doing little odd jobs here and there are dull-looking persons, with silly smiles and vague monosyllabic answers, doing what they are told in an inferior way, masturbating, obscene, often filthy. These are the simple præcox cases." [1]

Dementia præcox occupies a distinctive place among the psychoses. It shows the highest hospital admission rate of all the psychoses, and since such cases enter early in life and have an exceedingly unfavorable recovery rate, there is a continuous accumulation, with the result that dementia præcox patients now constitute the largest single institutional problem in this country. They outnumber patients with all other forms of mental disease combined. They are twice as numerous as persons in hospitals for the treatment of tuberculosis. They exceed the total population of all institutions for the feeble-minded and epileptic and state prisons.[2]

16. *Paranoia and the Paranoid Conditions.*—This group comprises cases which show fixed suspicions, persecutory delusions, dominant ideas, or grandiose trends logically elaborated and with due regard for reality, once a false interpretation or premise has been accepted. Further characteristics are formally correct conduct, adequate emotional reactions, clearness and coherence of the train of thought. Neither hallucinations nor deterioration occurs in strict clinical paranoia.

True paranoia is rare. The paranoid conditions, occupying a place midway between paranoia and paranoid dementia præcox, are found more frequently.

17. *Epileptic Psychoses.*—The more prominent clinical features of the epileptic psychoses are (a) epileptic deterioration, characterized by a gradual development of mental dullness, slowness of association and thinking, impairment of memory, irritability or apathy; and (b) epileptic clouded states, mani-

[1] Myerson, *op. cit.*, p. 88.

[2] Furbush, Edith M., "The Social Significance of Dementia Præcox." *Mental Hygiene*, Vol. VI, No. 2, April, 1922, p. 288.

festing usually dazed reactions with deep confusion, bewilderment and anxiety, excitement with hallucinations, or fears and violent outbreaks.

18. *Psychoneuroses and Neuroses.*—Recently these terms have been used by many writers as though synonymous. On the other hand there has been the tendency to designate as psychoneuroses such functional conditions as are due clearly to psychic causes and as neuroses those disorders in which, while the symptoms are both mental and physical, the primary cause is thought to be physical. The three chief forms of these orders will be described.

Neurasthenia is marked fundamentally by an increased liability to fatigue. "The tired feeling that comes on with a minimum of exertion, worse on arising than on going to bed, is its distinguishing mark. Sleep, which should remove the fatigue of the day, does not; the victim takes half his day to get going; and at night, when he should have the delicious drowsiness of bedtime, he is wide awake and disinclined to go to bed. This fatigue enters into all functions of the mind and body. Fatigue of mind brings about lack of concentration, an inattention, and this brings about an inefficiency that worries the patient beyond words as portending a mental breakdown. Fatigue of purpose brings a listlessness of effort, a shirking of the strenuous, the more distressing because the victim is often enough an idealist with over-lofty purposes. Fatigue of mood is marked by depression of a mild kind, a liability to worry, a lack of enthusiasm for those one lives with or for the things formerly held dearest. And, finally, the fatigue is often marked by a lack of control over the emotional expressions so that anger blazes forth more easily over trifles, and the tears come upon even a slight vexation. To be neurasthenic is to magnify the pins and pricks of life into calamities, and to be the victim of an abnormal state that is neither health nor disease." [1]

"By the term *psychasthenia* is understood a group of conditions in which the bodily symptoms, as fatigue, sleepless-

[1] Myerson, A., in *A Mental Health Primer,* Published by the Massachusetts Society for Mental Hygiene, p. 10.

ness, loss of appetite, etc., are either not so marked as in neurasthenia or else are overshadowed by other more distinctly mental symptoms. These mental symptoms are of three main types: first, a tendency to recurring fears of all kinds and descriptions, fears which have received formidable Greek names but which are fears of open places, of closed places, of being alone, of dirt, of disease, of all kinds and manner of situations. Second, there is a tendency to obsessive ideas and doubts which persist in coming against the will of the patient. In extreme psychasthenia the difficulty of making up the mind, of deciding, becomes so great that a person may suffer an agony of internal debate about crossing the street, putting on the clothing, eating the meals, in fact, about every detail of acting and thinking. Third, there is a group of impulsions and habits. The impulsions are sometimes absurd, as when a person feels compelled to step over every crack, to touch the posts along the journey, or to take three steps at a time. The habits range from the desire to bite one's nails to the quick, which is so common in children and which persists in the psychasthenic adult, to the odd grimaces, facial contortions, blinking of the eyes and cracking of the joints of the inveterate 'tickeur.'

"The third great psychoneurosis is *hysteria,* which almost defies a short account. I shall very briefly mention the main types of symptoms. In the first place there is a hysteric temperament and an emotional instability, with a tendency to prolonged and freakish manifestations. Fundamental in the personality of the hysteric is this unstable emotionality, which is, however, secondary to an egoistic, easily wounded nature, craving sympathy and respect, admiration and achievement, but unable legitimately to earn them. Next is a group of symptoms, the so-called paralyses, which may involve any part of the body and persist in certain cases for years. These paralyses yield remarkably to any energizing influence like good fortune, the compelling personality of a physician, clergyman, or healer (the miracle cure), or a serious danger." [1]

Considerable attention has been given to these disorders

[1] MYERSON, *A Mental Health Primer, op. cit.,* p. 11.

because, while the percentage of admissions to hospitals is small, this group of diseases constitutes the pathological conditions most frequently encountered. They make up the bulk of the clientele of neurologists and psychiatrists in both private and out-patient practice.

Their problem must be viewed, too, in the light of their tremendous social significance. Even the mildest cases result in appreciable diminution of efficiency. Could it be reckoned, the sum total of the economic and social liabilities produced by the neuroses would be far greater than the damage inflicted on society by the psychoses.

19. *Psychoses with Psychopathic Personality.*—The basis of these disorders is so-called psychopathic personality, which, in itself, however, is not a psychosis. "There is no class of patients more confusing and irritating to physicians, court workers, and psychiatric social workers than the group termed constitutional psychopathic inferiors. . . . In general, by the term constitutional psychopathic inferiority one means an individual who is ill equipped from birth to meet the demands of his environment. This defect is not like that found in mental deficiency which involves primarily the intellectual assets of the patient, but a defect consisting of an apparent constitutional lack of responsiveness to the social demands of honesty or truthfulness or decency or consideration for others, which incapacitates the patient from settling down to any permanent standardized activity. The individual is, therefore, emotionally unstable, is not to be depended upon, acts on impulses, shows poor judgment, and is constantly led into unwise activities, the consequence of which he is able to realize intellectually, but not evaluate." [1]

Such a personality may easily become the background for episodic psychotic attacks of irritability, excitement, transient confused states, paranoid outbreaks, depressions, prison psychoses, and the like.

20. *Psychoses with Mental Deficiency.*—As the term indicates, this means a combination of mental deficiency and disorders definite enough to be classified as psychotic.

[1] Strecker and Ebaugh, *op. cit.*, p. 328.

21. *Undiagnosed Psychoses.*—In clinical psychiatry, it is inevitable that cases will be found which do not fit entirely into any of the types or classes posited. Under such circumstances, the scientific spirit requires a suspension of judgment rather than a forcing of the issue which does violence to the facts. Such cases had best be classed as undiagnosed until further information is available.

The following table will make clear the relative frequency of the chief forms of mental disease which have been described.[1]

TABLE II

	Per Cent
Dementia Præcox	27.0
Manic-depressive	16.0
Senile psychoses	12.1
General paralysis	10.6
Psychoses with cerebral arteriosclerosis	6.4
Involution melancholia	3.3
Psychoses with mental deficiency	3.2
Paranoia and paranoid conditions	2.8
Epileptic psychoses	2.7
Alcoholic psychoses	2.3
Psychoses with psychopathic personality	2.3
Psychoneuroses and neuroses	2.1
All other psychoses	9.2
	100.0

THE COST OF MENTAL DISEASES

The National Committee for Mental Hygiene estimates that at the present time a total of $80,000,000 is spent annually for the maintenance of hospitals for the mentally diseased. The economic loss to the nation of these hospital cases annually is placed at $300,000,000. It is interesting to recall, in this connection, that the total expenditures by all official agencies, local, state, and national, for public health service in the United States in 1922 was $60,000,000.

The cost of caring for the hospital cases of mental disease in any state making reasonably adequate provision exceeds any single item of public expense except that for public

[1] Pollock, H. M., and Furbush, E. M., "Comparative Statistics for State Hospitals for Mental Disease, 1920," *Bureau of Statistics, National Committee for Mental Hygiene*, New York City.

education. It may be said, without fear of contradiction, that no other disease or group of diseases is of equal importance from a social and economic point of view. Moreover, the cost is mounting steadily. Not only is the number of persons entering hospitals increasing rapidly, but they are entering at an earlier age, their expectation of life is longer, and their earning capacity is greater.

The data cited above express only the more obvious items in the cost of mental diseases. A complete assessment of the burden which they impose upon society, if it could possibly be made, would stagger the imagination.

The cost to society of mental disease among persons at large is many times that of institutional cases. Strecker and Ebaugh point out, for example, that for every one of the emotional psychoses treated in hospitals, psychiatrists have three to four others under observation "who exhibit varying degrees of affect and mood disorder, perhaps not so pronounced as to indicate institutional care, but certainly severe enough to be productive of behavior deviations which lessen the efficiency of the individual in all his contacts; reduce not only his own, but often, also, the economic and social constructiveness of those who are immediately related to him, and therefore, of necessity, lower the general morale of society." [1]

Beyond the non-institutional patients under professional observation are many unidentified and, frequently, unsuspected cases. Limiting the effort all must make to adjust themselves to community and social life are many physical and mental handicaps. Those of a physical nature are as a rule readily detected and allowance is made for them; but mental or nervous handicaps are neither so readily nor so generally recognized, nor so easily taken into account.

It is just this failure of recognition which leads to such disastrous consequences. "Psychopaths are not infrequently elected to public office and epileptics are not disqualified from driving high-powered and dangerous motor vehicles. The engineers of our fastest trains must not be color blind, but

[1] Strecker and Ebaugh, *op. cit.*, p. 160.

they occasionally are victims of the most fatal of all mental diseases—general paresis. The navigating officer of a transatlantic liner, responsible for the lives of hundreds of passengers, must pass an examination for a license, but he may be dominated by delusions which escape observation because they are not looked for. Important trials, where human lives were at stake, have been presided over by insane judges. Army officers in command of troops in time of war have been influenced by imaginary voices." [1]

Pratt calls attention to another group who contribute much to the discomfort, distress, and unhappiness of many homes and communities. "They are the persons with no discoverable physical disease, who seek to translate their mental and nervous difficulties and conflicts into terms of physical invalidism—a major division of those much-maligned individuals who chronically 'enjoy ill health.' The fact that the complaints of such people are usually expressed in terms of the physical must not be misleading, although that is precisely their purpose. The underlying cause is invariably hidden, but often will be found to have its roots imbedded in a life situation which the patient cannot handle without symptoms and to which he cannot adjust himself, while its continuance, if unmodified, becomes intolerable or impossible. Recognition or admission of the true situation, even to himself, is not compatible with his self-esteem, and unintentionally, unconsciously, subconsciously if you like, a protective coloring is assumed in the form of pseudo-physical complaints." [2] Such persons are not only constantly inefficient themselves, but also are burdensome in many ways to those with whom they come in contact.

Of particular social and economic significance is the problem of psychopathology in the workshop. Both industry and labor are showing increased interest in the part played by nervous and mental diseases in the industrial world. Psychologists in this field are learning many things: that it is necessary

[1] May, James V., *op. cit.*, p. 31.

[2] Pratt, George K., *Your Mind and You*, Funk & Wagnalls, New York, 1924, pp. 8-9.

and profitable to go beyond the superficialities of intelligence testing, vocational guidance, and the like; that industrial unrest is a symptom of mental disorganization, involving more than "instincts," "urges," and "motives"; that the real ill lies in a fundamental disorientation to life which shows itself in a general disordering of values; that it is the "total situation" of the individual worker which so frequently is defective; and that this is different in each individual and must be dealt with from this standpoint.[1] Similar progress is being made in an understanding of the bearing of these disorders, especially in their incipient stages, upon the problems of the school.[2]

"One out of two cases of social trouble," the late Dr. Southard of Boston is quoted as having said, "is a psychiatric one." While there may be those who will deny the generosity of such a claim, there can be no denial of the fact that mental factors in one form or another complicate, and in many cases entirely condition, the individual and social situations which require attention.

"The intimate relation between mental diseases, alcoholism, ignorance, poverty, prostitution, criminality, mental defects, etc., suggest social and economic problems of far-reaching importance, each one meriting separate and special consideration. These problems, while perhaps essentially sociological in origin, have at the same time an important educational bearing, invade the realm of psychology, and depend largely, if not entirely, upon psychiatry for a solution." [3]

REFERENCES FOR FURTHER READING

(See End of Following Chapter)

[1] MAYO, ELTON, "The Irrational Factor in Human Behavior," *Annals of the American Academy of Political and Social Science*, Philadelphia, November, 1923, pp. 117-130.

[2] "Three Problem Children," and "The Problem Child in School," published by the *Joint Committee on Methods of Preventing Delinquency*, New York. See also GREEN, *Psychanalysis in the Class Room*, G. P. Putnam's Sons, New York, 1922.

[3] MAY, *op. cit.*, p. 33.

CHAPTER XXV

PROBLEMS OF MENTAL HYGIENE

Enough has been said to indicate the proportions, and importance to society, of the problems of mental disease. The present chapter is devoted, first, to a consideration of the causative factors, since these condition all efforts to deal with the problem; second, to the development of facilities for the care of the mentally diseased; and, third, to the mental hygiene movement which aims at the promotion of the general mental health.

I. THE ETIOLOGY OF MENTAL DISEASES

In the whole history of medicine there is no more discouraging chapter than the views entertained from time to time concerning the causes of mental diseases. Interpretations in terms of demoniacal possession and of the influences of the moon arose early and remained dominant until in the nineteenth century. In fact, it is only within the last twenty-five years, as we have been emerging from the era of custodial care and entering one of scientific investigation and highly specialized treatment, that any real advance in the field of etiology has been made. The genesis of large groups of psychoses, notably dementia præcox and manic-depressive, is still problematical, but psychiatrists have ceased to regard the causation of mental diseases as a closed book about which they must be content to speculate. It is this change in attitude, in the last analysis, which constitutes the really important gain of the last quarter of a century in psychiatry. The spirit and method of work, not the stage of development attained, is always of primary importance.

Methods of Approach

Two conceptions, one physiological and the other psychological, have dominated the recent study of mental diseases. Although differing widely in their mode of dealing with the subject, both have been founded upon the employment of the scientific method. The physiological approach assumes that the phenomena found in mental diseases are manifestations of changes occurring in the brain and to these devotes all its attention. The psychological approach, on the other hand, regards the conscious processes occurring in mental disease as the actual phenomena with which it is called upon to deal.

These viewpoints originally were widely apart and even antagonistic to each other. Within recent years they have been drawing together gradually, realizing that, to utilize an old illustration, they had been looking at opposite sides of the shield, that physical and psychological factors work in a vicious circle which may be broken into, according to one's viewpoint, at almost any place.

The Non-Specificity of Mental Diseases [1]

By way of preface to the further discussion of etiology of mental diseases, we need to remind ourselves that "the processes that lead to the development of any morbid condition are immensely complicated and closely related to one another, and disease is almost always the culmination of a long series of more or less detrimental or destructive conditions which eventually become sufficiently strong to break down the barriers of natural and acquired resistance." [2] In other words, we "are always dealing with the total reactions which are the end result of the constant interplay between individual and environment." [3]

This is particularly true of the problem under consideration here. Every case of mental disease means the break-

[1] Strecker, E. A., "The Non-specificity of Mental Disease," *Mental Hygiene*, Vol. VII, No. 2, April, 1923.
[2] *Ibid.*, p. 279.
[3] *Ibid.*, p. 280.

down of a particular constitution under the accumulated stress of the circumstances through which it has passed. Most psychoses result, not from an acute process, but from a gradual impairment of resistance, either because the person by original equipment is unable to meet the ordinary demands of life, or because these demands are too frequent and too severe, or because both conditions existed. Once the resistance has become seriously impaired, even an insignificant thrust from the environment may be sufficient to break through, and then for reality or sanity there is substituted unreality or mental disease.[1]

To single out any one circumstance in a case of mental disease and consider it as THE cause is to do violence to the facts. Even in the case of so obvious a factor as syphilis, it is significant that a minority of individuals infected display marked mental and nervous disorders.

The following factors are selected for brief discussion because of their relative, but by no means exclusive, importance in the causation of mental diseases.

Heredity

The quality of the hereditary equipment must be considered in every case of mental disease. When there is evidence of the transmission of a neuropathic or psychopathic constitution, the factor assumes primary etiological importance. How frequently this happens is still an unsettled question. Recent estimates differ as widely as the older ones, ranging from 15 to 90 per cent.

Without depreciating its undoubted importance, existing data on the rôle of heredity in mental diseases must be contemplated with extreme caution. The striking differences in the conclusions reached suggest that many investigators have but found what they were looking for. Frequently, too, heredity has been a ready refuge in cases which failed to respond to treatment. Certainly much of the data gathered has simply shown how frequently mental diseases are to be

[1] STRECKER and EBAUGH, *op. cit.*, pp. 5-6.

found in the family histories, without proof of causal relationship.

Recently, some psychiatrists have resented the emphasis which has been placed on heredity, to the belittlement of other facts. They cite the results of their analyses, which show that many individual traits are conditioned early in life as a result of the influences exerted by members of the family, and they insist that many defects of personality which have been conceived in the past as entirely the products of germ plasm determiners molded in strict accordance with the laws of heredity, are in reality the result of environmental factors in the early life of the individual, subsequently buried from sight. It seems inevitable that conclusions on the importance of heredity as a factor in mental disease must be reconstructed on the basis of our growing knowledge of the psychopathology of childhood and its importance.

The scientific study of heredity in mental diseases is no easy matter. Certainly it is more difficult to follow than the mode of inheritance of feeble-mindedness. "Unlike the latter trait, insanity is seldom manifested until after the period of adolescence, and very frequently appears in middle life and even in old age. This circumstance creates a difficulty in the way of tracing the operation of any Mendelian factors which may be responsible for the insane diathesis, since a considerable proportion of people fail to reach the age at which their hereditary taint might become manifest, and since also it is necessary to know the whole life history of the individuals concerned." [1]

Another difficulty emphasized by Holmes is the "circumstance that a hereditary proclivity to insanity may be present, but owing to favorable conditions of life and the absence of events that might upset an unstable nervous constitution, a person may escape falling a victim to his inherited defect. It is probable that a fair proportion of the hereditarily insane might have been saved from their unfortunate fate had they been properly shielded from adverse influences." [2] On the

[1] HOLMES, *op. cit.*, pp. 47-48.
[2] *Ibid.*, p. 48.

other hand, mental diseases due largely or wholly to environmental factors, may appear in successive generations.

Certainly the conception of a single similar hereditary predisposition for all psychoses is untenable. There are many different mental diseases, resting upon different bases, and often little related to each other. The ills of the mind are as varied as those of the body, and to speak of a single hereditary basis for mental diseases in general is comparable to attributing all kinds of heritable physical anomalies to the same cause. "It may be true," says Holmes, "that a single defect in the germ plasm may manifest itself in a variety of ways and in many degrees. But analogy with the transmission of the bodily traits should make us very cautious about considering the insane diathesis as a unit character of essentially the same kind in the different cases in which it is manifested. Charts of the inheritance of insanity show that the afflicted individuals exhibit a great diversity of symptoms in successive generations. The possibility must, therefore, be borne in mind that the germ plasm of neurotic stocks may be affected in a variety of ways, and that the varied exhibitions of disordered mentality are the result, in part at least, of this circumstance."[1]

Finally there is always the difficulty of a complete discovery of all the facts in the family history. The idea that "insanity" is a disgrace is still too widespread to expect that no impedimenta in our researches should arise from this source.

Syphilis

Syphilis deserves special consideration and emphasis as a cause of mental diseases. Approximately one-fourth of all admissions to institutions are due to the direct and indirect influences of this disease.

The chief psychosis resulting from syphilis is paresis, commonly known as softening of the brain. This dread condition results from an invasion of the nervous system by the germs of syphilis, involving the destruction of nerve cells and

[1] Holmes, *op. cit.*, p. 49.

fibers in the spinal cord or brain tissue. From 10 to 15 per cent of all first admissions to mental hospitals are due to paresis.

Future researches are likely to attach increasing importance to this factor. "The blood test for syphilis is one of the most reliable, if not the most reliable, single blood test available to the worker in mental disease. Inasmuch as syphilis of the nervous system may through its special ways of affecting brain and spinal cord imitate practically every other kind of mental disease, it becomes important to eliminate the hypothesis of neurosyphilis from virtually all cases of long-standing mental disease, particularly if this disease occurs in the male sex. It is possible for the nervous system to harbor spirochætes that cause syphilis without yielding any symptoms whatever, at all events for years or even decades." [1]

Exogenous Poisons

This term includes various deleterious substances which are taken into the body, the chief among them being alcohol and drugs of various kinds.

The rôle which alcohol plays in the production of psychoses, while an important one, is difficult to determine. A number of factors complicate the problem. To begin with, for many individuals, intemperance is the expression of a psychosis, and in no wise its cause. To others, such as the psychoneurotic, it offers an escape from reality. Then there are the unresistive types, who drink little but are especially susceptible to injurious effects from it. Finally there are the definite alcoholic psychoses and those in which alcohol is one of the etiological factors.

Alcohol is the essential cause of the alcoholic psychoses. These have constituted from 3 to 5 per cent of first admissions in recent years. These psychoses are of comparatively short duration; the recovery rate is more than 50 per cent, hence the number of patients under treatment is always less than the annual admission rate.

[1] Southard and Jarrett, *op. cit.*, p. 458.

There is abundant evidence that alcohol is a contributing etiological factor in many psychoses not primarily dependent upon it. Of new admissions in New York in recent years, excluding the alcoholic psychoses, from 12 to 20 per cent were intemperate users of alcohol. Apparently it is important as a precipitating factor in senile psychoses, paresis, psychosis with cerebral arteriosclerosis, dementia præcox, and paranoia.

Alcohol appears to be of declining importance. In the Civil State Hospitals of New York the percentage of cases of alcoholic insanity dropped from 10.8 in 1909 to 3.2 in 1922; the per cent of intemperate users among new admissions from 28.7 in 1909 to 12.5 in 1922. Changes in the habits of the people and prohibition are responsible for the decline.[1] Although there was an increase in the percentage of first admissions with alcoholic psychoses from 1922 to 1923, that for the latter year is still lower than it was in 1919, the year before the passage of the Eighteenth Amendment.

Drug addiction is responsible for about 1 per cent of first admissions, and the percentage is apparently decreasing, despite certain popular statements to the contrary. Prohibition has not increased drug addiction. Alcoholic and drug users are two entirely different psychological types.[2]

Focal Infections

Much attention has been given of late to chronic or focal infections as causative factors in the production of mental diseases. That such infections exist, often without any evidence of pain, pus, swelling, or fever; that they may persist for years, insidiously poisoning the system; and that they have an important bearing upon the individual's health—are now clearly recognized.

The chief primary sources of such infections are the mouth, particularly around the teeth and tonsils. Secondary foci, usually resulting because the microörganisms migrate from

[1] Pollock, H. M., and Furbush, E. M., "Prohibition and Alcoholic Mental Diseases," *Mental Hygiene,* Vol. VIII, No. 2, April, 1924.

[2] Kolb, L., "Types and Characteristics of Drug Addicts," *Mental Hygiene,* Vol. IX, No. 2, April, 1925.

the primary sources, can be found in the stomach and duodenum. Cotton, among others, reports startling results from corrections of such disorders.[1] It is not unlikely that fuller knowledge of such infections, with more ready facility in their detection and identification, will reveal them to be even more significant than now appears.

Endocrinal Disturbances

The important influence exercised by the glandular structures on the human organism has long been recognized. The earliest evidence of this relationship was furnished by the study of alterations due to the removal of the sexual glands. While no statistics are as yet available, there is no doubt but that endocrine conditions play an important rôle in the causation of mental disorders. The ductless glands, notably the thyroid, thymus, pituitary, adrenals, and sex glands, furnish very definite and specific secretions necessary for the development and functioning of the organism. The activities of these glands are closely related; disturbances of any one undoubtedly bring about disturbances in the others. Focal infections, reference to which has just been made, may appear in glands. Recent practice, it may be noted, has shown the prostate gland to be a secondary focus far more frequently than was formerly supposed; and with rather marked effects upon the mental and nervous life of the patient. Here is a very important field in which a great deal of research work is necessary.

Mental Causes

It is a rather striking fact that, apart from indefinite references to such general factors as grief, worry, fear, fright, and disappointment, there should have been through the years so little reference to the part played by mental causes in the production of mental diseases. And yet, when one recalls the lack of psychological training of members of the medical profession, who dealt so exclusively with these cases in the

[1] Cotton, H. A., *The Defective, Delinquent and Insane,* Princeton University Press, 1921.

past, and the fact that the older psychology, with its roots in the philosophy of John Locke and its limitation to the stream of consciousness, had nothing to offer by way of aid, the situation can readily be understood.

In recent years, the enormously important work done by Janet, Freud, Jung, and others has revolutionized our conceptions by showing the significance of the part which mental factors play in the lives of all individuals, and has resulted in a fundamentally different and new approach to the study of mental abnormality.

Underlying this new approach are certain hypotheses of a rather fundamental nature. In the first place, it involves the biological way of regarding the human mind. Since Darwin's work, as a result of the concept of evolution and the work of numerous anthropologists and functional psychologists, there has grown the idea of the continuity between the mental life of man and of the lower animals, that the difference is one of degree of development rather than of kind, that the fundamental inherited groundwork of mental equipment which man has in common with other animals determines many of the most important events of our lives.

In the second place there is involved the conception of a mental hinterland, usually referred to as the "unconscious," and meaning nothing more or less than the historical past of the psyche. The term "unconscious," as used by Freud and others, includes all those psychic manifestations of which the person is not aware. It is made up of repressed material, built up like an alluvial deposit through the years; of the primitive impulses that have been inhibited and sublimated in the development of the child. The "unconscious," then, is the basic core of our mental life, and the immense advances that have been made in recent years in our knowledge of mental processes consist precisely in the recognition and analysis of the non-rational and unaware factors which play so large and fundamental a part in our mental life.

Finally, there is the fundamental principle of mental causation, or psychic determinism—that is, the idea that there is

nothing accidental or arbitrary in the psychic life, that chance has no more part in psychology than in physics.[1]

At least two concepts are fundamental to an understanding of the interpretation of mental abnormality advanced by the New Psychology. One of them is the *complex* and the other that of *mental conflict.*

A *complex* has been defined as a system of connected ideas, with a strong emotional tone, and a tendency to produce actions of a certain definite character. "Complexes may be of all sorts and kinds, the component ideas may be of every variety, the accompanying emotional tones pleasant or painful, very intense or comparatively weak. . . . Complexes, then, are causes which determine the behaviour of the conscious stream, and the action which they exert upon consciousness may be regarded as the psychological analogue of the conception of 'force' in physics. They are not, of course, constantly active, but only become so under certain conditions. These conditions consist in the presence of a 'stimulus,' occurring whenever one or more of the ideas belonging to a complex is roused to activity, either by some external event or by processes of association occurring within the mind itself."[2] To grasp the significance of the complex, it should be remembered that its action is often indirect, so that the conscious processes produced may have but little *prima facie* relation to the causes responsible for it; similarly, that the individual may believe his thoughts or actions to be the results of other causes, which have in reality played no part whatever in their production, but are only the effects of a subsequent process of rationalization.

Mental conflict is a term used to indicate a condition in which the complex is not in harmony with the mind as a whole. As a result, a state of "conflict" arises which is essentially a struggle between the complex and the personality. It is a mind divided against itself.[3]

"In order to gain an idea of the place which mental con-

[1] Freud, S., *Psychopathology of Everyday Life,* authorized English edition with introduction by A. A. Brill, The Macmillan Company, New York.
[2] Hart, *op. cit.,* pp. 62-63.
[3] *Ibid.,* Chaps. V-IX, inc.

flicts occupy in the life of the individual it is necessary to look upon existence as a continuous series of adjustments—some simple and some highly difficult and complex—between fundamental instinctive demands, on the one hand, and the requirements of society on the other. In the young infant, the care given by others makes these adjustments unnecessary. If this care is not forthcoming the individual perishes, as there exists no mechanism by which adjustments can be made. In the child, the adjustments required are few and relatively easy, but as life unfolds they increase in number and complexity. . . . These never-ending conflicts between the requirements of reality and the demands of instincts determine behavior, both individual and social. The sex instinct is involved most frequently and most profoundly in these conflicts. According to Freud, it is directly or indirectly involved in all. It is probably more within the bounds of moderation to consider these conflicts as involving any of the fundamental instincts, the sex instinct most often. It can readily be seen that the necessity for continuous adjustments between the powerful and unalterable urgings of the instincts and the constantly changing requirements of daily life presents innumerable opportunities for mishaps or for the establishment of habitual reactions which are undesirable. Few individuals achieve conspicuous success or conspicuous failure in this great struggle which makes up the most of mental life." [1]

From this brief outline, it may perhaps be appreciated why psychoses and neuroses are often seen as attempts at adaptation—pathological and disastrous in most cases, to be sure, but presenting themselves to the patient as the only possible solution under the circumstances. "They represent, in many cases," says Salmon, "flights into the unreal from intolerable situations in the life of the individual. Biologically, these results may not always be the most unsatisfactory solution, for they often prolong life. The psychosis is not infrequently an alternative to suicide. As society estimates success, however, they are failures in adaptation. . . . One person deals

[1] Salmon, T., in Rosenau, *Preventive Medicine*, fourth edition, *op. cit.*, pp. 440-441.

with an intolerable situation by taking refuge in silence, inaccessibility, and refusal to eat, and, in consequence, goes to a hospital for the insane, while another devotes himself to altruistic work which not only increases his self-esteem and heals the hurts of an unkind fate, but at the same time benefits his fellow men." [1]

Perhaps this brief summary of Freud's theses will help to clarify the conception of the psychosis as a wish, and of the importance of the "unconscious" in this connection. First, Freud ascribes all neurotic disorders to the existence in the patient of wishes which are unrecognized. His use of the term "unconscious" includes wishes of this unpremeditated character. Second, he regards the neurosis as a spontaneous expression of the tendency toward the fulfillment of such unconscious wishes. The neurosis contains a motive. It embodies an underlying intention to supply a void not clearly recognized and defined because existing outside the precincts of consciousness. Third, the wishes which occupy the sphere of unconsciousness are of a character ethically unadmissible in the sight of consciousness. There is, therefore, a repression, or a psychic conflict which is the basic factor in the production of the neurosis. Fourth, such symptoms as appear are the expressions of a tendency toward the fulfillment of the wish, but they are indirect, cunningly veiled representations of them. They are substitutions which are affiliated by association with the original underlying idea. Each symptom, in other words, is the dramatic portrayal of the repressed wish subjected to a process of modification through the effort of consciousness to evade its real significance.

It is easy, and somewhat of a fashion, to criticize separate aspects of the work of Freud and others of the recent psychopathologists. Freud's emphasis upon the love-life of the individual, misrepresented as narrowly sexual, has been unpalatable to many persons. But the real basis of their work, and their essential contribution, has been the emphasis upon the psychological processes of the mind as essential to an under-

[1] Salmon, *op. cit.*, p. 440.

standing of the mental reactions involved in the development of mental disorders. Future researches may modify some of their conclusions, but this much is certain, that never again can mental disturbances be considered without taking into consideration their point of view.

Immigration and Mental Diseases

Even in so brief a summary of the factors in mental diseases it is impossible to avoid special reference to immigration. Institutional data show a preponderance of foreign-born considerably in excess of their numerical importance in the general population. A study of nearly 35,000 first admissions to approximately 100 state hospitals for mental diseases during 1923 shows that 29 per cent were foreign born. In the census of the general population of the country for 1920, it was found that 13 per cent were foreign born. Their higher age level accounts in part, but by no means wholly, for this difference.

The disproportionate amount of mental disease among this element can easily be accounted for. Million upon million have been admitted into the country without adequate examination of, or evidence concerning, their mental condition. Many have had no trade, and more have been illiterate. Thus handicapped, they are projected into our most congested centers of population, to bear a stress as severe as any group can be called upon to endure. Furthermore, it is not unlikely that the frequency with which adult males have migrated alone, involving the disruption of home life and the severance of regular sex relations, has had its effects.

Different races seem to be susceptible to different psychoses. Hebrews and Italians have the highest rate for dementia præcox, and with the Germans lead in the frequency of relative admissions for manic-depressive. Alcoholic psychoses appear twice as frequently among the Irish as among any other racial group. The Slavonic race has the highest rate for general paresis, while the psychoses of old age seem to be most prevalent among the races of mixed origin.

II. DEVELOPMENT OF FACILITIES FOR CARE AND TREATMENT

The Policy of Restraint

So long as mental disorders were attributed to supernatural factors, and taken cognizance of only when associated with conduct socially intolerable, the one object of care was restraint for the protection of society. Milder forms were treated by spiritual means, like visits to the shrines of certain saints who were reputed to have special skill in the exorcism of devils. But the great majority, because of the conditions of disorder and poverty which attended them, were accorded institutional care, for the dual purpose of removing their menace to society and of extending the material aid which the community provided.

Since there were no institutions specially devised for their care, jails and almshouses were used extensively in the earlier days, one or the other being utilized as the phenomena of disorder or dependency predominated. As time went on, however, preference was given increasingly to the almshouses, such a policy comporting more readily with the spirit of the rising humanitarianism. Throughout the first half of the nineteenth century, and during a considerable part of the latter half, most of the insane, then, were cared for in poorhouses under local jurisdiction. Nearly every state has its history of such local emergency provisions, when first the jail and then the poorhouse were looked upon as the proper places for the insane. A tragic chapter might be written of the horrors which attended mechanical restraint, replete with chains, grated doors, cells, dungeons, balls and chains. It is still possible to find, in almost every state, conditions as frightful as they have been at any time during the last two hundred years.

The Beginnings of Specialized Care

The modern hospital treatment of mental diseases in this country is the result of a development which represents the progress of nearly two centuries. The first necessary step in this direction was the development of specialized facilities

for their care. The beginnings of this movement date back to 1752 with the establishment of the Pennsylvania Hospital, in Philadelphia, a part of which was set apart for the insane.

The first institution designed and used exclusively for the insane was established at Williamsburg, Virginia. It was incorporated by the House of Burgesses in 1768, and the first patients were admitted in 1773. It is significant to note that the act of incorporation designates it as a "Public Hospital for Persons of Insane and Disordered Minds," that it authorized the appointment of physicians and nurses, and that it specifically designates the institution as a hospital and not an asylum. Other states followed in the development of special facilities. Maryland in 1797, New York in 1808, Massachusetts in 1818, Connecticut and Kentucky in 1824, North Carolina in 1828, Ohio in 1838, Maine in 1840, developed either separate buildings or separate institutions for their care.

The Development of State Care

It will be observed that these specialized institutions were established, for the most part, by the respective states, their intervention being necessitated by the horrors and inadequacies of local provisions. It was Dorothea Dix, of Massachusetts, who more than anyone else was responsible for the inauguration of the policy of state care for the mentally diseased. In 1837 she began her investigation of conditions of paupers, lunatics, and prisoners around Boston. What she found she described by tongue and pen in a way that challenged attention. Extending her investigations ultimately to every state east of the Rockies, she carried her fight for the "hitherto unvoiced claims of the demented" to every part of the country, memorializing no less than twenty-two different state legislatures on the subject. Her agitation rapidly bore fruit. While an extensive bibliography bears witness to the controversy waged between the adherents of county and of state care, the shift has been steadily toward the latter. One state after another has accepted the principle of centralized responsibility, even though the development of necessary fa-

cilities has been lacking in varying measure. Every state without exception recognizes today the necessity of making provision for the care and treatment of the mentally diseased. Every state has at least one state hospital in operation. The total number in the United States now is 163. States with the largest number are New York, 16; Massachusetts, 13; Illinois, 9; Ohio, 8; Pennsylvania, 8; California, 6; Indiana, 6; Michigan, 6; Minnesota, 6. These institutions represent one of the most important activities conducted by any state government. Today, from one-sixth to one-third of every state's expenditures is for the support of mental hospitals.

As previously emphasized, no state has yet provided facilities which are wholly adequate. The situation was brought home with special keenness after the World War, when place was bought for soldiers who presented mental and nervous problems. Moreover, the care of the mentally diseased is not yet exclusively a state function. Many are still cared for in almshouses. In thirteen states, county or municipal institutions are maintained, and in twenty-five, such persons may be cared for in almshouses.

From Custody to Psychiatry

The hospital pretensions of the early state institutions must not be taken too seriously. After all, for many years such institutions, although representing a distinct improvement over the horrors of local provisions, were but asylums offering custodial care. Treatment at the best consisted of "moral means," that is, by persuasion and by isolation, which was considered conducive to meditation. It was far along in the nineteenth century until any considerable number of physicians, including those attached to state institutions, were convinced that insanity was the result of disease, not specifically different from physical disorders, and within the province of their profession.

The translation of this cardinal fact into institutional practice has been even more recent. As late as 1894 Dr. S. Weir Mitchell, in delivering the annual address at the semi-centennial meeting of the American Medico-Psychological Asso-

ciation in Philadelphia, charged that most states were still operating along the lines of the past, and what is infinitely worse, they seemed satisfied with what they were doing.

It is only within the last twenty-five years that actual hospital care, curative in purpose and in fact, has become a reality. Many institutions, of course, still lag behind, but each year sees an increasing percentage of mentally sick persons returned to their homes from such hospitals, well, contented, and able to resume the interrupted thread of their lives. The term asylum is becoming as obsolete as the word lunatic, and the care implied by both is destined, one hopes, at least, to disappear within a generation.

Mental disease has become a distinct speciality in the field of medicine and is known as Psychiatry. Its progress, while somewhat subsequent to, is now promising to keep pace with, the remarkable achievements of medical science in general. "Brain specialists," with their theory of mental disease as an affection of the brain, have had their day. The conception of mind and body as two separate units is now happily discarded. So many other portions and functions of the body are now known to be involved that mental disease is coming to be thought of more and more as affecting the whole human organism. Modern psychiatry insists "that we look at the patient as a human being and from the whole point of view, with a knowledge of how he fits into his niche in life, not merely as an impersonal machine suffering from heart disease or stomach trouble or eye strain." [1]

III. THE MENTAL HYGIENE MOVEMENT

Programs for dealing with problems are conditioned fundamentally by our understanding of their nature. The present mental hygiene movement is the inevitable result of our recent progress in the field of Psychiatry. To conceive of insanity as the result of mental disease, and of mental disease as symptoms of certain pathological conditions in the organism, at once places the problems involved within the province

[1] Pratt, G. K., *Your Mind and You,* Funk & Wagnalls, New York, 1924, p. 6.

of hygienic effort, with the dual objective of preventing such diseases and of keeping people mentally well. And this, in simple words, is the purpose of the mental hygiene movement.

"The foundation of the present-day conception of mental hygiene may be said to have been laid by Adolf Meyer in 1906, when he described the fundamental principles which he believed to be concerned in the development of dementia præcox. He saw in this disease a disorder of the personality due to a deterioration of mental habits—in other words, to faulty mental hygiene. While his views as to the etiology of dementia præcox have not been generally accepted, they suggested an entirely new avenue of approach to the problem of mental diseases in general." [1]

Two years later, in 1908, there appeared a book—*A Mind That Found Itself*—written by Clifford Beers. Beers, suffering from a common psychosis, had spent some time as a patient in both public and private institutions. An educated observer, with collegiate training, he had been impressed by the fact that the question of mental diseases was a public health problem of paramount importance. His book was written to enlist the coöperation and support of the public in this question. It is recognized as one of the classics of psychological literature. Its results have been profound and far-reaching.

The plan which Beers formulated for an organized mental hygiene movement received prompt and effective support. In 1908 he organized in Connecticut the first state mental hygiene society, and a year later the National Committee for Mental Hygiene began its existence. Numerous other state societies have since been formed, and the movement has received most encouraging support from an extensive array of notable persons.

The purposes of the national and state organizations, as stated in their own literature, are: "to work for the conservation of mental health; to help prevent nervous and mental disorders and mental defect; to help raise the standards of care and treatment for those suffering from any of these dis-

[1] May, *op. cit.*, p. 130.

orders or mental defect; to secure and disseminate reliable information on these subjects and also on mental factors involved in problems related to industry, education, delinquency, dependency, and the like; to aid ex-service men disabled in the war; to coöperate with federal, state, and local agencies and with officials and with public and private agencies whose work is in any way related to that of a society or committee for mental hygiene. Though methods vary, these organizations seek to accomplish their purposes by means of education, encouraging psychiatric social service, conducting surveys, promoting legislation, and through cooperation with the many agencies whose work touches at one point or another the field of mental hygiene." Both in its medical and popular aspects, the mental hygiene movement has assumed enormous proportions and now has many ramifications. Several of its more important aspects will be considered briefly.

Scientific Treatment

It is imperative, by reason of the symptoms, that many persons mentally diseased be removed from their usual environment and committed to institutional care. The nature of these diseases demands that such institutions be hospitals in which the emphasis is laid upon treatment, with the subordination of the idea of control "within the reasonable limit of caution"; that the problem be approached from the general hospital point of view; and that such hospitals have the equipment, staff, and facilities for the employment of all the latest methods.

The State Hospital the Basic Unit.—Under present circumstances, the state hospital seems destined to be the basic factor in our programs for dealing with mental disorders. There are private hospitals which do excellent work, but for obvious reasons the goal to be sought is the assumption of state responsibility. State care involves more than a mere transfer of responsibility. Whenever this has happened, the result has been a better level of intelligence and humanity in

dealing with the cases under care. It raises the prevalence of mental disorders with their causes, prevention, and management into the dimensions of a state problem of the first magnitude.

The Problem of Admission.—The extent to which a state hospital can be used is limited by the conditions under which patients are admitted. The matter of commitment procedure is intimately associated with the evolution of the conception of insanity. Many legal definitions and formalities now prevail. Most laws are concerned with the legal custody of the insane, not the hospital treatment of the sick—the result of the old English principle that no person against his will may be deprived of his liberty without due process of law. Judicial procedure has therefore been the customary form of commitment in the past.

Some progress has been made in this direction in recent years. The present tendency is to make admission easier, with commitment procedure shorn of its legal features. The chief step in this direction has been the enactment of voluntary commitment laws, and in many states this has been the only step taken in harmony with the trend of modern psychiatric opinion. Voluntary commitment, begun in Scotland in 1862 and initiated in the United States by Massachusetts in 1881, is now authorized in a majority of the states.[1]

After-care of Patients.—The responsibility of the mental hospital does not end when the patient leaves its walls. Because of the peculiar nature and importance of the social factors involved in most cases, the mental hospital, if it is to fulfill its curative and reconstructive purposes, cannot refuse the task of aiding discharged patients to resume a normal life and of preventing a recurrence of the disorder. After-care work with mental patients is now rapidly coming to be recognized as an important part of their treatment. It was the first form of social work that was undertaken with mental cases, and from it has developed the present type of psychiatric social work.

[1] WHISMAN, H. S., "Commitment Procedure and the State Hospital," *Mental Hygiene,* Vol. VII, No. 2, April, 1923.

"The establishment of facilities for after-care, help in resumption of normal life in the community, and guidance in prevention of recurrences of disability fall within the scope of mental hygiene. Social-service workers having experience with mental cases and mental out-patient clinics, whether organized by the institutions or by community effort quite independently of any special institution for the care of mental cases, are agents to accomplish these ends. The urging of their employment by institutions may well become a mental hygiene activity." [1]

Wherever effective after-care service has been rendered, as in New York and Massachusetts, it has been of undoubted value. Not only does it permit many more patients to live outside the hospital than would otherwise be possible without such supervision, but it educates the community, in regard to mental diseases. The isolated mental hospital is an anachronism. The present-day hospital must be a center radiating information to the community on all matters pertaining to mental health.[2]

Early Treatment

The early stage of any disease is often a critical period. Just as first aid applied to an injury may determine the final outcome, so the early treatment of a mental disorder determines frequently its future course. One of the most frequently heard expressions in daily practice with mental cases is the plaintive cry, "If only this case had been brought to me sooner." Teachers, clergymen, employers, social workers, and parents can render a distinct service to the cause of mental hygiene by advising and encouraging professional care at the earliest possible moment.

The Psychopathic Hospital or Ward.—There ought to be in all large centers of population a special hospital or ward in the general hospital to receive all classes of mental patients

[1] Abbott, E. S., "The Field of a State Society for Mental Hygiene," *American Journal of Insanity,* Vol. LXXVII, No. 3, January, 1921.

[2] Gegenheimer, R. A., "After-Care Work with Mental Patients from the Point of View of a Psychiatric Social Worker," *Mental Hygiene,* Vol. VIII, No. 3, July, 1924.

for first care, examination, and observation and to provide for short intensive treatment of acute and incipient cases. The term psychopathic hospital, after years of indiscriminate application to all sorts of activities related to mental diseases, is now coming to be restricted to this type of institution. The first psychopathic hospital thus conceived was established at the University of Michigan in 1906. In 1912 the first such development in connection with a state hospital was opened at Boston. It is interesting to note that, according to a report by the Department of Commerce, a total of 33,432 patients were admitted to psychopathic wards of general hospitals during the year 1922. The total number of patients in these wards on June 1, 1923, was 1,842. The rapid turnover indicates that it is the temporary case which primarily finds its way into the psychopathic hospital. Psychopathic hospitals thus exercise a sort of clearing-house function, and return to the community many patients who would otherwise be subjected to the stigma, if there is one, of a legal commitment.[1]

Out-patient Clinics.—Even more important in the development of a program for the early treatment of mental cases is the out-patient clinic. This device, developed originally in England and transplanted to this country in 1885, serves two functions, not wholly separable. One is the continued treatment of former patients living in their homes and returning periodically for direction and guidance. The other is diagnostic and advisory—a consultation clinic—aiming at constructive service in the incipient stages of disorder so as to prevent their further development.

The out-patient clinic, whether maintained as a part of the service of the state hospital or by some other agency in the community, is becoming the pivot point from which mental hygiene work is radiated. In 1913 New York, and in 1914 Massachusetts, adopted state-wide plans of having the state hospitals hold clinics, usually monthly, in the larger centers of population in the district tributary to the hospital, as well

[1] MAY, *op. cit.*, Chap. VI.

as at the hospital itself. Since then, this plan, besides developing rapidly in these two states, has crept into most of the other states of the Union. Teachers, court officers, physicians, preachers, and social workers are utilizing them more and more in the conduct problems which they encounter. To extend their usefulness, these clinics are held in the evenings, and at places advertised in the daily press.

The value of the mental clinic to the patient has been stated by Thom: "Not only do they provide for the treatment of the maximum number of patients at the minimum cost, but they bring the patient into contact with the psychiatrist and his organization during the early and incipient stages of disease. Assistance is made available at a time when treatment is most hopeful and when the patient is still capable of realizing his own needs. Treatment is given in a manner that makes it acceptable and compatible with the patient's social and economic obligations. It permits him to carry on his work during his rehabilitation and to continue to dwell in the community, in the environment in which he must manage to live if he is to play a part in the social scheme of things. He learns to carry his burden, not by laying it down and retiring to an artificial environment, but by developing new methods of meeting difficulties, minimizing waste effort, permitting some one else to help in eliminating irritating environmental factors, and thereby overcoming worry and anxiety that are out of all proportion to the situation." [1]

The value of the mental clinic to the community has been summarized thus: "It is an educator not only to the physician who conducts the clinic, but to the physicians of the community who send patients for consultation, and to those who attend, and to the lay public with whom the clinic or its agents come in contact. The community learns that here is a new way and a new place to get help in some of its troublesome problems. The clinic gives a better understanding of what the mental hospital is for, what it can do, how it does it. It breaks down the prejudice against the mental hospital, and

[1] Thom, D. A., "Results and Future Opportunities in the Field of Clinics, Social Service, and Parole," in *Annual Report, National Conference of Social Work*, 1922, p. 376.

brings the latter and the community into closer, more sympathetic, and more helpful relations to each other."[1]

Preventive Work

Two conclusions inevitably suggest themselves to the student of mental diseases: first, that so many cases, on the basis of our present knowledge, are so obviously and so pitifully unnecessary; and, second, that the causative factors involved in these cases extend far afield, into every aspect of social life. Thus stand revealed at once the nature of our problem and the hope of our reward.

The program for the prevention of mental diseases is a part of the larger program for social hygiene. "To stem the tide of syphilis, to wage war on alcohol, to counsel against marriage of defectives, to generalize the insane hospitals, to specialize the general hospitals, to weed defects out of general school classes, to open out the shut-in personality, to ventilate sex questions, to perturb and at the same time reassure the interested public—these are infinitives that belong perhaps in a rational movement for mental hygiene. They are things the past has taught us more or less clearly to do, and in that sense the movement for mental hygiene is surely not more than the elaboration of the obvious."[2]

Those who have emphasized the importance of the psychological factors, the satisfaction of wishes, and the adjustment of the personality to the environment, have also found that the problem has ramifications in our whole social structure. They see that worker, student, adolescent, child, parent, all have their peculiar problems of adjustment. Their injunctions will be like those of Salmon: "Determine the inherent capacity of each individual to make adjustments to his environment; realize that the causes of most maladjustments in later life arise in the early years of childhood; aid each individual to find the level at which he can live most successfully; cultivate a frank emotional attitude, especially in matters

[1] Abbot, E. S., "Out-patient or Dispensary Clinics for Mental Cases." *American Journal of Insanity,* Vol. LXXVII, No. 2, October, 1920, pp. 224-225.

[2] Southard, E. E., "Notes and Comments," *Mental Hygiene,* January, 1921.

relating to sex; deal with actualities and so do not evade difficulties or transform them into a false situation; cultivate an objective view of life, enjoying to the full art, literature, and music, and other desirable means of escaping into the world of reality, but at the same time realizing their real nature; distribute interest throughout a wide range of activities, reserving an important place for those who do not contribute directly to self-gratification but which benefit others." [1]

THE PROMOTION OF MENTAL HEALTH

Modern psychiatry is doing more than giving us a scientific understanding and treatment of mental diseases—it is contributing a new insight into human behavior. Likewise, mental hygiene comes to include measures which promote health as well as prevent disease. "Mental hygiene becomes most important to social progress when its relation to the normal individual is recognized and its positive, constructive program for improving the adjustment of even the tolerably well-adjusted is appreciated. A mental-health program that applies only to the markedly abnormal indicates a lack of comprehension of what mental health really means and the fundamental psychology that it implies." [2]

Of the manifold aspects of the larger program for the promotion of mental health, one deserves special consideration because of its profound significance—the mental hygiene of childhood. Psychiatrists all agree that the effect of the first four or five years of life is vitally determining. Some even go so far as to say that nothing counts after that time. Certain is it that the importance of the home stands revealed anew, as do also the responsibilities and possibilities of parenthood. What constitutes a good home must be reinterpreted on the basis of our newer understanding. The mystery which once surrounded the appearance of so many undesirable personalities in so-called "good homes" is now a long way in process of solution. The harm, often well-nigh irreparable, which

[1] Salmon, T., in Rosenau, fourth edition, *op. cit.*, p. 448.

[2] Taft, Jessie, "The Relation of the School to the Mental Health of the Average Child," *Mental Hygiene,* Vol. VII, No. 4, October, 1923, p. 673.

the best-intentioned parents may do their children becomes ever more clear.

The home is as fundamental and important psychologically as we have been wont to consider it in the biological and economic sense. Mental hygiene must begin with parents—because of their children. The gains in mental health which could result from a new generation of parents with but a modicum of the new insight into parent-child relationships really defies the imagination. The problem of mental hygiene needs to be attacked at this point and in many ways.

Impressed with the long-range nature of any approach through the parents, as well as with its inherent difficulties, modern mental hygienists have turned to the public school. The teacher is hailed as the dominant figure in the mental hygiene movement. "The only practical and effective way to increase the mental health of a nation," says Jessie Taft, "is through its school system. Homes are too inaccessible. The school has the time of the child and the power to do the job." [1] Much is to be said in support of such a program. Certainly there is available no better laboratory for the study of behavior, or for the conduct of experiments in its direction and modification, than the public school. These opportunities are being utilized increasingly. Classes in the training of public school teachers in mental hygiene backgrounds, the development of the work of the visiting teacher and the school counselor, and the rapidly growing use by the school of psychiatric clinics, are showing not only the tremendous need for this work, but the very striking rewards that follow it as well.

THE PSYCHIATRIC POINT OF VIEW

The essential contribution of the mental hygiene movement to modern thought is the psychiatric point of view. Its fundamental need is to translate that point of view into action. In fact, the psychiatric point of view is mental hygiene, for it is a point of view which sees every problem of conduct as a product of a process which may be understood and controlled.

The psychiatric viewpoint is revolutionizing both outlook

[1] TAFT, *op. cit.*, p. 687.

and procedure in the entire field of social welfare. The statement that every other human problem is a psychiatric one was but yesterday considered as the radical utterance of an enthusiast. Today it is almost a commonplace to say that every human problem is a psychiatric one.

Crime, to cite an obvious example, is now approached almost exclusively from the psychiatric point of view. This is the essence of the work of Healy and the clinical criminologists: *viz.*, that all conduct is an expression of mental life which exists in the form of mental content. The question of the percentage of mental disease and deficiency found among criminals is but an incidental one. Under the influence of the psychiatric point of view, clinics for the study of behavior come to be established. That these, once begun, become permanent fixtures, is a clear proof of their need and of their value.

Of the greatest significance is the penetration of the psychiatric point of view into the field of industry. "In industry there has been a growing conviction that though economic disorders and conflicts do not by any means necessarily arise from diseased or morbid mentality, a good deal of it does so arise, and that the worker must be viewed as a human being seeking satisfaction for his emotional and instinctive needs, as well as a 'hand' capable of so much production, to be used or exploited for the advantage of the owners and managers of industry. Recognition of this fact is rapidly growing, and though it has only here and there borne tangible fruit in a technic of study and treatment, its indirect results are manifested by a wider interest in the life and welfare of the worker, which is wholesome and promises great benefits." [1]

Above all, however, that one may hope for from the psychiatric point of view is a better understanding of life and of one's fellows, a greater tolerance of their characteristics, a higher respect for their personalities, a more abiding charity for their faults, a deeper respect for their virtues. And per-

[1] Myerson, A., in Rosenau, *Preventive Medicine and Hygiene, op. cit.*, fifth edition, pp. 434-435.

haps it is not too much to hope, a keener understanding and perspective of one's self.

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Part Four

CHANGING BACKGROUNDS AND CONCEPTIONS

CHAPTER XXVI

THE APPEARANCE OF THE INDIVIDUAL

The viewpoint of modern science is genetic. Charles Darwin made it very clear that life can be understood only as its evolutionary background is known. Herbert Spencer disclosed the universal application of this fact. All scientific thought becomes, therefore, broadly speaking, biological. Every science sees its problems in historical perspective. Everything has a pedigree, a history. This is what evolution means. What it implies is that to understand anything, one must know its history, its origin, its development. Modern Gestalt Psychology emphasizes laterally what science since Darwin has involved longitudinally—the impossibility of appraising anything outside of its setting or situation.

There is nothing unique about the problems of social well-being in this respect. They, too, must be considered in perspective—both laterally and longitudinally. Not only the nature of these problems, but the attitudes taken toward them and the methods developed to deal with them, are conditioned by the prevailing form of social organization, and change ultimately in accordance with its evolution. It seems pertinent, therefore, to review briefly the general evolution of society, with particular reference to the status of the individual in the group in the several forms of social organizations, since this fact is of such fundamental importance in this connection.

SOCIAL SOLIDARITY IN EARLY CIVILIZATION

In the early stages of human society, people were forced to function in rather compact groups. Kinship, real or fictitious, was the bond which held its members together. The relation of the individual to his group was all or nothing. Individual capacity was used for the advantage of all its

members. On the other hand, individual incapacity, if not too serious a handicap to the group, in which case it might be eliminated rather ruthlessly, shared in the welfare of all. Most property was owned in common, and consisted largely of the free gifts of nature. It will be understood, however, that this high sense of communal coöperation was not due to the existence of any superior traits or ideals of primitive man. Rather is its explanation to be found in the fact that only by group solidarity and mutual aid could survival be secured in the conflict with unconquered nature and hostile groups. It was a time when social coöperation, in which the individual was subordinated to the society in which he dwelt, comprised the most efficient means of getting on in the world and of meeting possible aggression.

An excellent illustration of the responsibility of the kinship group for its individual members may be seen among our ancestors in the practice of the wergild, a term used to denote the value put by the law upon every man's life. "When our Teutonic ancestors emerge into history something more than a millennium and a half ago each man is the center of a united group of kindred who act on his behalf partly because they have his welfare at heart, but mainly because public opinion, the law, and their own views of life make them guilty with him if he commits a wrong, and almost equally liable to penalty; or, if he is slain, throw upon the whole group the responsibility for vengeance or satisfaction. Every relative of a slayer up to his second or third cousins contributes according to his degree of kinship to the wergild, which alone can avert the blood feud. On the same principle the wergild received is apportioned among the kinsmen of the man slain." [1]

Besides the power of protecting and revenging its members, the kindred exercised a number of other functions; it acted as a contracting party in settling marriages with members of other kindreds; it exercised the right of wardship with regard to minors; it provided a family tribunal in case of certain grievous offenses against unwritten family law, espe-

[1] Ross. E. A., *Principles of Sociology,* The Century Company, New York, 1920, p. 439.

cially in the case of adultery; it supported those of its members who had been ruined economically and were unable to maintain themselves. In the case of pauperism the whole kindred was liable, the degree of relationship determining the contribution of each kinsman. Similarly, whole communities, if a poor harvest befell, visited their neighbors and looked to them for temporary support. In a sense the brightest aspect of primitive life is to be found in its freedom of giving, induced partly by the sense of common necessity, and facilitated by communal living. Nature seems to have been careful to provide early folk with ties of relationship which raised them above individual isolation.

Ross points out the curious fact that in some parts of the Southern states, particularly among the Appalachian mountaineers, this long-forgotten kindred grouping was revived. "The lack of law and order in the mountains caused the kindreds to take it upon themselves to avenge the slain man, and burdened them with a heritage of feuds which ended only when the courts proved strong enough to execute justice. In other parts of the South the kindred constituted a mutual-aid association. Blood relatives, whether congenial or not, were cherished in the hope that if the bread-winner met with misfortune perhaps Cousin Jim and Uncle Ben and mother's folks would see that Molly and the babies did not come to want. So it was the custom to make much of the ties of blood, to exchange visits with kinsfolk, and to go out of one's way to favor one's kin in business and politics. It was a way of insuring one's family against the hazards of life. Northerners were astonished to see how, after the Civil War, very distant kinsmen came forward to assume the support of the widows and orphans of the Confederacy." [1]

INDIVIDUAL SECURITY UNDER SLAVERY

The kinship group failed in the struggle for existence as a whole. In the incessant tribal wars of the time such failure resulted in its conquest by a stronger group. The earliest fortune of conquered enemies was to be sacrificed, eaten, or

[1] Ross, *op. cit.*, p. 440.

tortured. But with cooler perception of permanent advantage, prisoners are spared and enslaved. This grace is reserved at first for women and children, but comes gradually to be extended to male captives. Thus arose the institution of slavery. It began when, and developed where, conditions favored it—that is, where the economic system was such that there was a gain in making a slave out of a war captive instead of killing him.

The significant point about slaves in connection with the study of social problems is that the slave was not responsible as an individual for his maintenance. While the institution rests upon the idea of the existence of a class of persons wholly or largely devoid of rights, the property of their masters and to be exploited by them, it did, nevertheless, guarantee to that class at least the minimum requirements of existence.

The condition of the negro under the system of slavery in the Southern states may be taken as an illustration in point. Individual slave-owners varied in disposition and in policy toward their human chattels, much like modern employers do toward their employees. But the master could be expected to do certain things, even if from ulterior motives. A good field hand before the Civil War sold for a thousand to fifteen hundred dollars. The range of an entire plantation might average anywhere from three to six hundred dollars. With hogs averaging two dollars apiece and horses and mules selling for sixty, the cost of a slave was relatively high. Under such circumstances, the slave-owner was less prone to neglect the requirements of living of a slave than the modern farmer will neglect a less costly horse or tractor. More than one Northern man coming South, expecting to find the slaves a terribly dejected lot, was amazed to discover most of them well kept and seemingly very happy. There have been altogether too many scenes from *Uncle Tom's Cabin* in the average American's conception of slavery. While that famous novel clearly represented what might be the extreme fruitage of the slave system, it surely did not represent the average working of the system. It was based on exceptional cases, cases

which all knew might be true, but which were by no means typical. "Life on a big plantation," writes a modern student, "was far from monotonous. Of course the happiness or suffering of the slaves depended quite largely on the disposition of the master, but we are persuaded that on the average there was much more of carefree joy than there was of unhappiness." [1]

This reference to slavery is not to be interpreted as a defense of an atrocious system which flourished in the early history of this country. The point to be taken, rather, is that the institution of slavery, which arose early in human history, involved a condition whereby individuals or groups, unable to meet the requirements of life in which they found themselves, not infrequently became attached to those who assumed such responsibility for them in return for such services as might be required of them. The slave, in other words, received a guaranty of the requirements of life in return for his labor.

PERSONAL RELATIONSHIPS IN THE FEUDAL REGIME

In the course of time the forces of social evolution led to the breaking up of the ethnic structure of primitive society. Gradually a new basis of social relations appeared. This new basis was that of contract. A personal relationship between leader and follower, between lord and vassal, replaced the ties of kinship as the bond underlying and uniting the social structure. To this transitional stage of social organization the term feudal is generally applied. Such a transitional stage is to be found in the history of the various races which have attained modern civilization. Sooner or later, the earlier basis of personal relationship coalesces with a system of land tenure. It was in this combined form that it characterized medieval Europe for several centuries after the break-up of the Carolingian Empire. The fact needs to be emphasized then that feudalism in Europe was not a mere system of land tenure, nor a system of political and military arrangements, but

[1] Weatherford, W. D., *The Negro from Africa to America,* G. H. Doran Company, New York, 1924, p. 142.

that it means "the entire organization of society from top to bottom." [1]

The details of feudal society in the Middle Ages varied considerably from place to place; nevertheless the general conditions were rather uniform. A régime of great estates, of hereditary tenures, dominated all of civilized Europe. The land, technically owned by the lords, was occupied by peasants, of several different grades of rank, and passed generally from father to son. These peasants were the instruments of cultivation, owing many duties and dues to their lords for this privilege. Much has been written of the burdensome nature and amount of these exactions. This forms, however, but a part of the picture of feudal life. "It would be quite wrong," writes a modern student of feudal institutions, "to assume that the rights and interests of the many were simply sacrified to the rights and interests of a few rulers, that the manor was nothing but an estate, cultivated and exploited for the sake of the lord and managed at discretion by his will and the will of his servants. On the contrary, one of the best established facts in the economic life of the manor was its double mechanism, if one may say so. It consisted, as a rule, of a village community with wide though peculiar self-government and of a manorial administration superimposed on it, influencing and modifying the life of the community but not creating it. This double aim and double mechanism of the manor must be noticed at the outset as a very characteristic feature; it places the manor in sharp contrast both to the plantation of slaves of the ancient world and to the commercial husbandry of a modern estate struggling for profit as best it may." [2] Taking the English manor as the most characteristic type of the feudal unit, one is reminded that many of the confusing details about the manor "have a simple and reasonable meaning when we consider them from the point of view of an all-round arrangement of each

[1] Adams, G. B., *Civilization During the Middle Ages*, revised edition, Charles Scribner's Sons, 1914, p. 191.

[2] Vinogradoff, Sir Paul, *Feudalism, The Cambridge Medieval History*, Cambridge University Press, Cambridge, 1922, Vol. III, Chap. XVIII, pp. 472-473.

locality for the settlement of all its affairs, administrative, fiscal, jurisdictional, as well as economic and civil."[1] The manor, in other words, was both a village community and the lord's demesne, but the village community lay at the basis of the whole.

Whether manor, as it was known in England, or beneficium or fief, as it was termed on the Continent, the social structure of the Middle Ages consisted of an enormous number of small and practically independent units. Difficulties of travel, decentralization of governmental organization, frequency of tolls and custom duties, all combined to isolate communities, with a resultant fixity of population. Under these confining and stabilizing influences, relations between individual members of these local communities were intimate and comprehensive. Everybody was intimately acquainted with everybody else. Common action and coöperation were the rule, rather than the exception, in the affairs of everyday life. Each man was bound, for example, to cultivate his strips of land in accordance with the rotation of crops practiced by his neighbors. Pasture and waste and wood lands were for common use. The raising of stock was a coöperative enterprise. In fact, the whole land was cultivated on an elaborate system of joint labor. These common activities bound the people together in a manner far more effective than anything we know in the modern world. Furthermore, there was a good deal of blood kinship between members of these communities. It is material to emphasize that the rural arrangements of feudal Europe retained many of the aspects of the earlier kindred. This was particularly true in England, Germany, and in the Scandinavian countries.

There is nothing surprising, therefore, in the fact that there is no historical mention of charity within the manor or fief. "When anyone suffered misfortune, he was among friends and relatives who were accustomed to share all the experiences of life and who would, therefore, attend to his need. . . . If there was a crop failure it affected the entire estate. If there was an epidemic, the absence of sanitary conveniences and

[1] VINOGRADOFF, *op. cit.*, p. 483.

medical knowledge meant that it would sweep through the entire village. If there was a fire, an accident, or a death, the burden was not allowed to rest upon an individual or his immediate family, but was shared by all his neighbors. There were plenty of cases of distress, but there was no occasion for organized charity." [1]

Mutual Aid Under the Gild System.—After the twelfth century, with the beginnings of the break-up of the feudal régime and the revival of commerce, there resulted some detaching of individuals from their various "primary" groups. Simultaneously, however, there developed the gild system among this detached element in the population. These gilds were of several kinds—merchant gilds, craft gilds, religious gilds. Whatever the purpose of these organizations with reference to their economic pursuits, within each gild there existed a high degree of community of interests and of mutual aid, resembling very much the earlier kindred or village community. It might not be amiss to speak of them in this respect as artificial kindreds, composed of detached individuals with common interests. One finds the merchant gilds, for instance, establishing beds in hospitals for sick members, assuming responsibility for the bereaved widows and orphans of their members, educating the latter, providing daughters with dowries, and in other ways rendering services to members in need. Similarly, among the craft gilds there came to develop elaborate rules to govern the assistance to be rendered to individual members and their families. At first such demands were met by spontaneous responses from the private purses of members, but as time went on, common funds were created, supplemented subsequently by legacies. These came to be used for the creation of almshouses, hospitals, and various other institutions, to be utilized for the care of needy members.

THE APPEARANCE OF THE INDIVIDUAL

The disintegration of the feudal system of Europe and the emergence of modern civil society was a gradual process, ex-

[1] Queen, S. A., *Social Work in the Light of History*, J. B. Lippincott Company, Philadelphia, 1922, pp. 275-276.

tending over more than five centuries. Especially from the fifteenth to the eighteenth centuries does one find the entire social life of western Europe in process of transportation. "For the revival of classical learning had come, the art of printing had been devised, spreading among men the knowledge of once buried treasures of thought, and science had begun to erect foundations for the work of the nineteenth century. The geographical horizon of Europe broadened so as to include the Far East, the African regions toward the South, and the New World of the West. Commerce leaped to the front, precious metals began to pour into the depleted treasuries of Europe, and inventive genius turned itself towards the development of manufactures. Secular statesmen supplanted ecclesiastical leaders in government, indicating that political and economic policies demanded a different type of mind. Theories of education came into discussion, and utopias were devised showing that the dreamers of the time were seeing visions of a social reorganization. It seemed like a new era to many, for as Campanella put it, 'Oh, if you knew what our astrologers say of the coming age, and of our age, that has in it more history within a hundred years than all the world had in four thousand years before. Of the wonderful invention of printing and guns, and the use of the magnet, and how it all comes to Mercury, Mars, the Moon, and the Scorpion.' All these and many other similar movements were seething during the three centuries of this transition from the old to the new. . . ." [1]

In this transformation one fact stands out clearly. The unit of the social structure ceased to be the compact and confined feudal community, and there appears upon the scene of history the isolated individual, a figure largely unknown to former ages, but who constitutes so striking a phenomenon of the modern world. And the essential fact about this individual was that he acquired gradually the freedom to move about. Just as the stability of medieval Europe depended on the fixity

[1] Dealey, J. Q., *The Family in Its Sociological Aspects*, Houghton Mifflin Company, Boston, 1912, pp. 62-64.

of all its parts, so that of modern society must be worked out on the basis of their mobility.

Professor Ross uses the term Individuation to designate "the processes which pulverize social lumps and release the action of their members." [1] He points out that conditions of living force people into compact groups wherein the individual becomes solidary with that group; but that "when the conditions of life take such a turn that the backing of his group is no longer a vital matter to him, the groups presently dissolve and the individual reappears." [2] The term seems an apt one for the process or principle involved.

This decentralizing process, whereby the intimate and all-inclusive group of earlier civilizations is resolved into individual units, is, of course, but the beginning, and not the whole part, of the story. Individuals still live and work and function in groups. In fact, the number and diversity of groups tend constantly to grow in the modern era, due to the increase in the number and diversity of interests about which they are formed. It is the nature of the relationship between the individual and the group which changes. Professor Cooley has aptly summarized the complement to the process of Individuation. "In primitive society," he says, "membership is intimate and inclusive, the individual putting his whole personality into it. But as groups become numerous and complex there comes to be a kind of parceling out of personal activities into somewhat impersonal functions, with special associates in each function. A person, while as much dependent as ever upon the group system as a whole, grows less and less identified with any one group. His relations become selective, each man working out for himself a system of life different from that of any other man, and not embraced in any one set of connections. Personality becomes more and more an organization by itself, distinct from that of any group, and forming itself by a special choice of influences. You cannot sum up the social environment and mental outlook of a man of to-day by saying that he is a farmer, or an artisan, or

[1] Ross, *op. cit.*, p. 439.
[2] *Idem.*

a priest, as you might have done in the Middle Ages. He may be a farmer and also many other things, a member of learned societies, an investigator in remote enterprises, a socialist, a poet—in short, a complex and unique personality." [1]

THE MOBILITY OF THE INDIVIDUAL

It has been pointed out that the essential fact about the individual who emerged with the advent of modern times from out of the all-inclusive group and communal life that prevailed in earlier centuries, was his freedom to move about. This mobility of the individual in modern life is a social fact of the utmost, fundamental importance. Not that the fact of the mobility of population is itself new. The dispersion of the human race over the surface of the earth must have begun in the earliest days of human history, for "the dawn of the historical period found the principal sections of the earth's surface already inhabited by races not widely different from those now native to them." [2]

The fact of human mobility is old; it is its modern character which is new and which gives it such peculiar social significance. Earlier migrations of men were group movements. It was the clan, tribe, village, or congregation which moved as such. These movements might be peaceful, or lead to warfare and bloodshed. Those of the tribal stage were apt to be gradual, in immediate response to the demands of food supply or changing climate—like the instructive "wanderings" of animals. Modern migrations are of individuals, predominantly of men, most generally of younger men. The "New Völkerwanderung" is new because it is the individual rather than the group moving about.

THE PHILOSOPHY OF INDIVIDUALISM

Philosophy follows experience and seeks usually to justify or to soften it. This is substantially what modern psychologists speak of as rationalization, and there has emerged re-

[1] Cooley, C. H., *The Social Process,* Charles Scribner's Sons, New York, 1918, pp. 249-250.

[2] Fairchild, H. P., *Immigration,* The Macmillan Company, New York, 1913, p. 1.

cently the "astonishing and perturbing" suspicion that "perhaps almost all that had passed for social science, political economy, politics, and ethics in the past may be brushed aside by future generations as mainly rationalizing. John Dewey has already reached this conclusion in regard to philosophy. Veblen and other writers have revealed the various unperceived presuppositions of the traditional political economy, and now comes an Italian sociologist, Vilfredo Pareto, who, in his huge treatise on general sociology, devotes hundreds of pages to substantiating a similar thesis affecting all the social sciences. This conclusion may be ranked by students of a hundred years hence as one of the several great discoveries of our age. It is by no means fully worked out, and it is so opposed to nature that it will be very slowly accepted by the great mass of those who consider themselves thoughtful." [1]

The development of the philosophy of individualism is an illustration in point. While the political ideals of the Teutons, the religious teachings of the Reformation, the belief in natural law, and other factors had been preparing the way for centuries, it was not until the latter half of the eighteenth century that individualism became a distinct philosophy or doctrine. Thus its development follows in the wake rather closely of those epoch-making changes which, pulverizing the "social lump," resulted in the appearance of the individual as a unit distinct from an all-inclusive group.

Individualism and Economic Revolution.—It is customary nowadays to look in the economic realm for the basic factors in social change. And, as every student of history knows, economic changes of great moment and magnitude occurred during this period. These changes took place first in England, beginning in the second half of the eighteenth century. So fundamental and comprehensive were these changes that the term revolution is usually applied to them. By the industrial revolution, then, is meant that series of epoch-making changes in the industrial life of the times which substituted

[1] Robinson, J. H., *The Mind in the Making,* Harper & Brothers, New York. 1921, p. 47.

the machine for the hand of man and the forces of nature for his brawn.

In order to understand the significance of the industrial revolution, it is necessary to remind ourselves of the economic system which immediately preceded it. During the course of the sixteenth century, as a result of the colonizing and commercial activities of the new national states of Europe, there came to obtain a policy whereby each state aimed to increase its stock of precious metals, maintain a favorable balance of trade, increase its population, and foster its manufactures. This was known as the mercantile system. It involved an enormous increase of governmental activities until in its ultimate development mercantilism become practically synonymous with governmental interference. But gradually, with the expansion of international relations and the growth of foreign markets, a broader and more cosmopolitan view obtained. Economic development, too, had come to the point, especially in England by the middle of the eighteenth century, where her industries were crippled by the very laws that had protected their beginnings.

The full tide of realization of the disadvantages of this restrictive system coincided with the beginnings of the new industrial development. The result was inevitable. Mercantilism was done away with. The essence of the new economic order came to be the substitution of competition for the many restrictive regulations which had existed previously. The doctrine of natural law, coming into prominence as the theoretical basis for revolution and democracy, emphasized private property and individual liberty, and this was interpreted to mean non-interference in internal industry as well as in external trade. In other words, the principles of political revolution were applied to the field of industry. The political rights of many were translated into terms of economic freedom and opportunity. The individual, isolated and free, stood out supreme in industrial, even as he was destined to in political, life.

If this would have been the sole feature of the industrial revolution it would have raised social problems of far-reaching

magnitude. "It is a great law of social development that the movement from slavery to freedom is also a movement from security to insecurity of maintenance. There is a close connection between the growth of freedom and the growth of pauperism; it is scarcely too much to say that the latter is the price we pay for the former. The first statute, which is in any sense a Poor Law, was enacted at a time when the emancipation of the serfs was proceeding rapidly. This is the Statute of Labourers, made in 1349; it has nothing to do with the maintenance of the poor; its object was to repress their vagrance." [1]

But the industrial revolution did more than this. It revolutionized completely every aspect of life. This new phenomenon in human history—the isolated individual—made his appearance under conditions of life as different from anything which had preceded them as possibly could be imagined. Moreover, these changes came upon him suddenly. Without warning, he was thrust, with many others like himself, in the newly created industrial towns, where the mutual aid of earlier communities was strangely nonexistent. He woke up to find himself working in factories of ever-increasing size, where he owned none of the means of production, where the old relationships disappeared and old responsibilities of employers for their workers were discarded. He was an individual with a new status, in a new world. In the former he had had no experience; in the latter there were no precedents.

Individualism in Economic Science.—Such changes are not without their social costs. As these appeared and accumulated, they began to challenge attention. Meanwhile the answer which the nineteenth century was destined to make to them was being formulated by a new school of economic students. The development of modern economic science began with Adam Smith, whose "Inquiry into the Nature and Causes of the Wealth of Nations," appearing in 1776, is perhaps the most influential economic treatise ever written. Two conceptions are woven into every argument of his work.

[1] TOYNBEE, ARNOLD, *The Industrial Revolution*, Longmans, Green & Company, New York, 1900, p. 76.

One is a belief in the supreme value of individual liberty. The other is the conviction that man's self-interest is God's providence, that the individual in pursuing his own interest is promoting the welfare of all. Naturally he opposed governmental interference of any kind and emphasized the importance and advantages of allowing each individual to follow his own self-interest. This policy of enlightened self-interest, of letting things drift, of regarding the state as justified only in the protection of its citizens against worse interference on the part of other citizens, was generally accepted by the economic students that followed Smith. Competition, free and unrestricted, became the dominant ideal of the nineteenth century, in spite of the limitations which necessity constantly enforced upon it in actual practice.

For decades, this philosophy was utilized to rob poverty of its sting—for those who were not poor. It was represented as nature's medicine, bitter indeed, but less bitter than any medicine that man could prescribe. If poverty was sharper at one time than another, this only meant that society was more than ever in need of this medicine. Thus did the smug, new-rich, nineteenth century rationalize its most challenging problem.

The Justification of the Biologists.—To the economic sanction which Adam Smith and his followers gave to individualism Darwinism added biological justification. Struggle, said the Darwinians, is the law of all life. Struggle is inevitable, incessant, inherent in the scheme of things. And its effects are selective, wholesomely selective. Only the strong, the able, the fit, survive. The weak, the incapable, the unfit, perish. It is a cleansing process which results, the matrix of progress. "Some have thought that this struggle for existence which is so evident in the animal world does not take place in human society. This, however, is a mistake. The struggle for existence in human society is not an unmitigated one, as it seems to be very often in the animal world, but it is, nevertheless, a struggle which has the same consequences. In the human world the competition, except in the lower classes, is not so much for food as it is for position and for supremacy.

But this struggle for place and power results in human society in the weak and inferior going to the wall, and therefore ultimately in their elimination. In all essential respects, then, the struggle for existence goes on in human society as it does in the animal world. This means that in society progress comes primarily through the elimination of unfit individuals. The unfit in human society, as we shall see, are especially those who cannot adapt themselves to their social environment. Progress in society, in a certain sense, waits upon death, as it does in all the rest of the animal world. Death is the means by which the stream of life is purged from its inferior and unfit elements."[1]

Individualism and Political Revolution.—It was inevitable that the new philosophy should take form in political arrangements and creeds. Arising as a reaction against the evils of overgovernment in Europe, the new philosophy of individualism found its most dramatic expression in the French Revolution, which the flamboyant Disraeli once characterized as one of the two events in all history. The revolutionary movement in France, like that in the New World in 1776, involved an assertion of the philosophy that had been crystallizing slowly, that man had certain private rights to life, liberty, property, and the pursuit of happiness; that these were inalienable under the laws of nature; that no government must interfere with or abridge these rights; that the proper purpose and function of the state are merely the protection of these rights; and that, in the words of the Declaration of Rights of 1789, "ignorance, neglect, and contempt of the rights of man are the sole cause of public calamities and the corruption of governments." Very naturally, then, modern democracy translated self-government to mean a decrease in the amount of government rather than the same kind of government as had existed in the past, even if self-imposed instead of by despotic autocracies. It emphasized individual freedom, individual rights, a minimum of government and of governmental interference with the affairs of

[1] Ellwood, Charles, *Sociology and Modern Social Problems*, The American Book Company, 1913, pp. 43-44.

the individual. In America, where a long contest had been waged against royal governors and against the restrictions of English control, an intense faith in the same principles accomplished the movement of rebellion and the formation of the Union. This faith was strongly intrenched in the organic law of the new nation, giving constitutional sanction to the doctrine of non-interference with the "natural" rights of the individual. The triumph of individualism, as a philosophical system, came at the very time when our federal and state constitutions were in the making, and they could not but reflect the dominant spirit of their time.

The significance of these revolutions was not confined to their effects upon the development of the countries in which they occurred, but in the stimulating and recreating influences which they exerted throughout Western civilization. "The nineteenth century," says Mr. Frederic Harrison, "is precisely the history of the work which the French Revolution left. The Revolution was a creating force even more than a destroying one; it was an inexhaustible source of fertile influences; it not only cleared the ground of the old society, but it manifested all of the elements of the new society."[1] In other words, the political events at the close of the eighteenth century made the nineteenth century a period of glorified individualism, with a constant insistence upon the rights, privileges, and opportunities of the individual citizen.

RESUME

The purpose of this chapter has been to sketch, albeit rather briefly and perhaps somewhat superficially, some facts in the historical background or setting of the problems of social well-being. Three of these facts, of outstanding importance in this connection, may be reëmphasized by way of summary.

The first fact is this: that the emergence of modern civil society is attended by a loosening of the group bonds which are so intimately and so essentially all-inclusive in the earlier

[1] Quoted by Ogg, F. A., *Social Progress in Contemporary Europe*, The Macmillan Company, New York, 1912, p. 31.

stages of society; and that there appears thus the individual unit, thrown relatively upon his own resources and his own responsibility. This transition involves a broadening, instead of a narrowing, of the individual's opportunities; but the organization of interests and activities which is the individual represents a personal and not a group choice. It is the individual *per se* who comes increasingly now to make choices, to bear losses, and to reap rewards. The individual is "on his own," as the saying goes. He faces the world not like formerly, as the member of a group with some slight incidental personal status, but as an individual with various and somewhat incidental group connections.

The mobility of the individual, the second significant fact to be noted in summary, is complementary to the first, and increases its social importance. It is his moving about that uproots him from his group setting, and to the extent that he continues to move he fails to take root elsewhere. The agricultural, industrial and communicational revolution[1] combined, of course, to effect his complete redistribution throughout Western civilization. Passes, as a result, the mutual aid of the feudal community. Lessens, now, the sense of responsibility of his kin. Less personal, less constant, less intimate become his relations with his associates, in business and in social life.

In many ways the third fact to be emphasized in summary is the most peculiar. That the philosophy of individualism should have developed during this transitional period can be easily understood; that it should actually have been believed generally and for decades will seem, to future generations, well-nigh incredible. Despite the misery, the maladjustment, the suffering and waste which were resulting from the fundamental social changes which have been referred to, economic and biological philosophy combined with political doctrine to prevent any constructive or fundamental social reform movements for the greater part of the nineteenth century. Gradually, however, in the older and more densely

[1] Chapin, F. S., *An Historical Introduction to Social Economy,* The Century Company, 1917.

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populated countries of Europe, the economic and social problems created by the appearance of the isolated individual under the conditions of modern industry proved so insistent and alarming that modifications of the policy of public non-interference were deemed increasingly necessary, until in the last quarter of the century rather comprehensive programs of social betterment, involving a new concept of society's duty to the individual, began to appear. Interesting and instructive for American students as these programs are, they must fall outside of the province of our present study.

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CHAPTER XXVII

THE SET-UP IN THE UNITED STATES

Modern society is inextricably complex; so, of necessity, must be its problems. The problems of social well-being in the United States, as well as the attitudes toward them and the methods of dealing with them, are the products of, and complicated by, many and diverse factors. Four of these factors are selected for discussion in this chapter, as being of primary importance and as constituting in combination that sociological set-up which is peculiarly American. These four factors are: first, the individualistic temper and tradition of the American people; second, the transformation within recent decades of the economic and social life of the people of the United States; third, the influx of immigration, with reference both to its volume and to its variety; and, fourth, the heterogeneity of the present population of the United States.

OUR INDIVIDUALISTIC BASE AND BIAS

One would rather expect such stark individualism as that depicted in the preceding chapter to develop most fully under the stimulating opportunities of a new world. This is exactly what did happen. Their absorption in individual interests and their reluctance to undertake things in combination with their fellows are the characteristics which more often than any other have been ascribed in the past to the American people by foreign observers. Social reform, which in European countries has implied for decades rather comprehensive programs of state action, has been associated until very recently in the United States with somewhat faint and uncertain projects of private beneficence. The coöperative movement, despite its signal success abroad, is in its infancy here. Socialism, the antithesis of individualism, has fewer adherents in the United

States in proportion to the population than in any other country of Western civilization.

The Early Selective Process.—There are definite causes peculiar to the past history of the American people which are responsible for so marked a development of this national characteristic. To begin with, there is the selective process involved in the establishment of the American republic. Speaking generally, it was the self-reliant and self-assertive individual who broke the social bond of the homeland, who left friends and neighbors, to stake all on the doubtful venture of migrating to a new world. It must not be assumed that emigration is always a winnowing process, selecting an alert, resolute individualistic type. This mistake is often made by superficial students and sentimental phrase-makers. Commonplace and even old-fashioned as it may sound, there is a difference between the Puritan or Cavalier or other subsequent types of early settlers, who left Europe to subdue a strange wilderness rather than conform to the will of the powerful, and the gullible European peasants of recent years who followed the lure of higher wages in a foreign labor market, as depicted in the propaganda of steamship companies. It is the priority in point of time and predominance in point of place of this earlier type which gave the new culture its individualistic base and bias.

The Frontier in American History.—If the circumstances of our national beginnings were such as to select the individualistic type of settler, even more did the conditions of our national adolescence continue to place a premium upon this type. No analysis of the characteristics of the American people would be complete which did not consider the significance of the frontier. "Up to our own day," said Professor Turner in 1893, "American history has been in a large degree the history of the colonization of the Great West. The existence of an area of free land, its continued recession, and the advance of American settlement westward, explain American development." [1] Throughout the greater part of our his-

[1] TURNER, F. J., *The Frontier in American History*, Henry Holt & Company, 1920, p. 2.

tory this lure of land was the controlling motive of our collective life. "For three centuries the descendants of the early settlers, together with the incoming immigrants, have responded to this call. The frontier was pushed back along the rivers and over the Allegheny Mountains like a great glacial moraine. It spread out over the northwest territory. Thousands of soldiers were settled by the government. In the closing years of the eighteenth century land companies opened up Ohio, Indiana, Kentucky, and Tennessee. New states were carved out of this territory. Long before the Civil War the settler found his way beyond the Mississippi River, inspired, as were his father and his father's father, by the desire for opportunity, an opportunity that was offered by the free land upon the frontier.

"This movement continued at an accelerated pace during the generation which followed the Civil War. These were years of phenomenal railway development. During the five years to September, 1873, $1,700,000,000 was expended in railway building. Much of this development was to the west of the Mississippi. During this period settlement followed the railways, just as formerly it had crept along the rivers, or followed the Great Lakes or wagon routes. A free homestead of 160 acres was a mirage of hope. It was the voice of opportunity calling to the pioneer. It brought to our shores the adventurous spirits of Europe. It converted the hills of New England into a region of deserted farms. More recently it lured the college men of the East to the prairie states and mining camps. The frontier has been pushed on and still farther on. Population has crossed the broad arid belt which, up to a few years ago, was known as 'the Great American Desert.' It reached and crossed the Rocky Mountains, in the face of the declaration of Thomas Benton that at these mountains 'the western limits of the Republic should be drawn, and the statue of the fabled god, Terminus, should be raised to the highest peak, never to be thrown down.' "[1]

[1] Howe, F. C., *Privilege and Democracy in America*, Charles Scribner's Sons, 1910, pp. 14-16.

The Significance of the Frontier.—In attempting an appraisal of the significance of the frontier, let it be remembered that it began in the seventeenth century, in the course of which it was advanced up the Atlantic river courses, just beyond the "fall line"; that step by step it crept across the continent; that American social development was continually beginning over again on the frontier; and that moving westward, the frontier became more and more American. "As successive terminal moraines result from successive glaciations, so each frontier leaves its traces behind it, and when it becomes a settled area still partakes of the frontier characteristics. Thus the advance of the frontier has meant a steady . . . growth of independence on American lines." [1]

The frontier is productive of individualism. It placed a premium upon the individualistic type. The conquest of a new continent requires the qualities which we associate with the American pioneer. The pioneer must act largely upon his own initiative. He must be able to go out into the wilderness with his ax and his rifle and recreate civilization. He must be his own physician and priest. Social organization is of a somewhat primitive type, based on the family. The tendency is anti-social. It produces antipathy to control. Any representative of the state or society is viewed as a representative of oppression.

The frontier is significant in many other ways. It determined, to a large extent, the American scale of wages. So long as cheap lands lasted, American laborers were insured against low wages. No man will remain for any considerable time in another's employ for wages appreciably less than he can earn on his own homestead. Employers of labor recognized, in general terms, that the wages they must pay must correspond to the productivity of labor applied to the land. It is this fact, that the wage-earner could adopt an alternative, and which left him a free man, that explains the high standard of living in the past history of the United States. It is this fact which explains the general well-being prevalent in

[1] TURNER, *op. cit.*, p. 4.

all new countries. In addition to insuring the American wage-earner against low wages, the continued existence of free or cheap land also served to protect them, at least in a measure, against the exigencies of unemployment and old age. Professor Turner, to whose penetrating appreciation of the importance of the frontier we are so much indebted, points out the frontier's potential competitive effects in the following words: "Whenever social conditions tended to crystallize in the East, whenever capital tended to press upon labor or political restraints to impede the freedom of the mass, there was this gateway of escape to the free conditions of the frontier. . . . Men would not accept inferior wages and a permanent position of social subordination when this promised land of freedom and equality was theirs for the taking."[1]

No less important was the effect implied in the preceding paragraph, that the frontier ever afforded a new opportunity for the unsuccessful ones. Always there were conditions on one frontier or the other which fitted the individual case and afforded the means of escape from former handicaps. To the failure and the misfit there always were the hope and stimulus of new opportunities. The unsuccessful man need not be permanently so. He always had another chance. And if he used up his opportunities without manifest personal gain, his family might nevertheless be the beneficiaries and thus the desired social result be achieved. Hardly an American in middle age but can recall examples of men and families deemed to be failures in the older social soil, who, transplanted to the newer West, took root and flourished, "growing up with the country."

The Creed of American Individualism.—By the beginning of the last quarter of the nineteenth century, when the frontier became less potent as a factor in this respect, particularly in so far as the northeastern part of the country was concerned, there began, largely in this very section, a stage of marvelous industrial development. In this development Europe furnished the liquid capital and the laborers, and the

[1] TURNER, *op. cit.*, p. 259.

United States the resources and the business leaders. Naturally, these leaders and masters of the new order were recruited largely from the ranks. Thus the ensuing decades were featured among other things by the spectacular rise to positions of prominence and power and wealth of men most of whom had begun life in a humble manner, achieving their exalted station in life within a comparatively few years. Thus were the opportunities of the frontier continued in the new industrial order. Every schoolboy has been familiarized with the careers of the most prominent ones, but beyond these there was an array of men, masters in their craft, who achieved leadership in their respective circles of business and their communities.

Stimulated by these examples, the possibility of economic success, and a passion for it, were impressed indelibly upon the character of the age. That America was the land of opportunity, that all who would could achieve, were sentiments echoed and reëchoed with enthusiasm throughout the country. What these men held up as examples had done, the ambitious and aggressive felt that they too could do. Thousands of young men began their careers each year, actuated by no other thought and inspired by no other hope than that of climbing speedily to the top of the ladder. "There is always room at the top," was the popular cry. One "must get there," in the vernacular of the street. By what route was immaterial so long as they "arrived" with a fortune. And such was the phenomenal growth and expansion of the material development of the country, and consequently so numerous were the captains recruited from the ranks, that there was nothing absurd or unreasonable in the expectation of the ordinary laboring man of becoming the manager or proprietor of a business of his own.

Surveying the tasks accomplished by the individualistic type in the building of the nation, it was entirely natural that his qualities should be extolled and embodied in the creed and philosophy of American life. It is not impossible, however, that we have misinterpreted our national success in

our laudatory emphasis upon the individualism of our fathers. A successful person is very prone to attribute his achievements to the traits and qualities in his make-up, and to ignore the conditions which favored his efforts. It may be so with a people. Because the development of our national traits and of our material progress have coincided in point of time does not imply necessarily that the latter is the result of the former. The man who nightly lights the candles is not responsible for the appearance of the stars. Even if the exploitation of a virgin land, filled with an unparalleled abundance of natural resources, demands certain qualities in the exploiters (and the cases of Australia and New Zealand would prove that it does not), it is equally true that the rewards it offers are as liberal as its opportunities are extensive. It might be that Americans have succeeded in spite of their individualism. But the possibility of error in interpretation of their success scarcely suggested itself to the people of the new world before the advent of the twentieth century.

Problems of Social Well-being in Individualistic America.—Social problems, in those balmy days of American adolescence, were relatively few in number. Social standards take form slowly, particularly so when the process is constantly beginning anew. Furthermore, opportunities were so varied and extensive, and the rewards of industry so generous and certain, that naturally the problem of standard individuals did not assume any considerable proportions. Nor were any definite contributions made to the methods of dealing with them. This does not imply that the American people were callous or niggardly toward the unfortunate. To any sort of known need there has always been ample response. The people of the United States are generous, always have been—and to a fault. But the problem behind the concrete need was not faced nor attacked in a fundamental way. Individual cases of need were dealt with, but the social problems involved were largely unrecognized or ignored. The reactions of society were haphazard. The relatively few cases were dealt with informally, incidentally, as befitted a people preoccupied with plans for material progress and dreams of individual

success. Throughout the entire nineteenth century it is possible to find scattered exceptions to these statements, but the fact remains that they are exceptional rather than typical. Speaking generally, then, no comprehensive programs for social betterment developed in the United States prior to the close of the nineteenth century.

THE TRANSFORMATION IN AMERICAN LIFE

Within a space of time incredibly brief, the economic and social life of the people of the United States was transformed, if not completely, at least in its dominant features. The factors in this transformation are commonplace, even if their rapidly accumulating effects are somewhat less appreciated. They will be discussed briefly.

The Industrialization of the United States.—Due to the American Revolution, which interrupted trade with Europe and threw the Colonies upon their own resources, the factory system gained a foothold early in the new world. The Non-intercourse Acts, the Embargo, and the War of 1812 further stimulated the new movement. Its growth continued steadily during the ensuing decades, and by the middle of the century the industrial revolution was in full sway in the United States. Industry, however, was still incidental to the main business of the nation; about three-fourths of our people in 1850 being engaged in agriculture.

It was really not until after the Civil War that the era of phenomenal industrial development which explains modern America began. The decade from 1880 to 1890 particularly was one of marvelous growth. Within these ten years, the amount of capital invested in manufacturing increased 134 per cent; the average number of wage-earners, 56 per cent; and the value of products, 75 per cent. In 1890, the Census showed for the first time a greater value in the products of manufacture than in agriculture, and by 1900 it was double that of farm products. This rapid industrial progress enabled the United States to outstrip all of her rivals in the volume of her manufactures. From fourth place in 1860 she attained first rank by 1894.

The rate of industrial development continued during the twentieth century at an accelerated rate, as the following table indicates:

COMPARATIVE SUMMARY: 1899 to 1919[1]

Factories, Excluding Hand and Neighborhood Industries	Wage-earners Average Number	Capital	Value of products
1899	4,712,763	$ 8,975,256,496	$11,406,926,701
1904	5,468,383	12,675,580,874	14,793,902,663
1909	6,615,046	18,428,269,706	20,672,051,870
1914	7,036,247	22,790,979,937	24,246,434,724
1919	9,096,372	44,466,593,771	62,418,078,773

The increasing industrialization of the country may be seen from another angle by a perusal of the following table in Professor Alvin H. Hansen's analysis of economic classes in the United States, based on the census returns:[2]

Groups	1870	1880	1890	1900	1910	1920
Farm laborers	2,885,996	3,323,876	3,004,061	4,410,877	6,143,998	4,178,637
Farmers	3,000,229	4,282,074	5,370,181	5,770,738	6,229,161	6,463,708
Proprietors and officials	581,378	807,049	1,347,329	1,811,715	2,879,023	3,168,418
Professional	414,708	666,338	1,114,507	1,565,688	2,074,792	2,760,190
Lower-salaried	309,413	529,473	965,852	1,329,928	2,393,620	3,985,306
Servants	975,734	1,075,665	1,454,791	1,453,677	1,572,225	1,270,946
Industrial wage-earners	3,328,351	5,286,829	7,360,442	10,263,569	14,556,979	17,648,072
Unclassified	1,010,114	1,420,795	2,118,498	2,467,043	2,317,538	2,138,971
Total	12,505,923	17,392,099	22,735,661	29,073,233	38,167,336	41,614,248

Representing this analysis in terms of percentage, the results are:

[1] *Fourteenth Census of the United States*, Vol. VIII, Manufacturers, Government Printing Office, Washington, 1923, pp. 14-15.

[2] *Journal of the American Statistical Association*, American Statistical Association, New York, Alvin H. Hansen, December, 1920, pp. 417-422, and December, 1922, pp. 503-506.

Groups	1870	1880	1890	1900	1910	1920
Farm laborers	23.1	19.1	13.2	15.2	16.1	10.0
Farmers	24.0	24.6	23.6	19.8	16.3	15.5
Proprietors and Officials	4.6	4.6	5.9	6.2	7.5	7.6
Professional	3.3	3.8	4.9	5.4	5.4	6.6
Lower-salaried	2.5	3.0	4.3	4.6	6.3	9.6
Servants	7.8	6.2	6.4	5.0	4.1	3.1
Industrial wage earners	26.6	30.4	32.4	35.3	38.2	42.4
Unclassified	8.1	8.2	9.3	8.5	6.0	5.1

Meanwhile, the changes in the character of industry, as indicated by statistics on the size and type of ownership, are as striking as those of its growth and expansion. Of the 9,096,372 persons employed in manufacturing industries in the United States at the time of the Census of 1919, less than one-third (29.2 per cent) were at work in establishments employing less than one hundred persons. Practically another third (31.2 per cent) were found in establishments employing between one and 500 wage-earners, 13.3 per cent in establishments ranging between 500 and 1,000, and 26.4 per cent in establishments employing more than 1,000 workers.[1] Furthermore, the dominant form of ownership is the corporation. While but 31.5 per cent of the 290,105 manufacturing establishments in the U. S. in 1919 were owned by corporations, 86.6 per cent of the wage-earners in manufacturing were at work in the corporation-owned establishments.[2]

Urbanization of Population in the United States.—With the coming of machine industry, and its concentration under the factory system, there began that remarkable shifting of population which has been so striking a characteristic of the recent history of Western civilization, and which in a fundamental sense lies back of all of our modern social problems. Its chief phenomenon has been the city, the peculiar and perhaps the greatest problem of modern life. The cities which existed prior to the nineteenth century were relatively few in number and consisted of comparatively small aggregates

[1] *Statistical Abstract of the United States, U. S. Department of Commerce*, Government Printing Office, Washington, 1921, p. 221.

[2] *Ibid.*, p. 222.

of people who had gathered about military, religious, or trading centers. The modern type city differs from its predecessors, then, not only in regard to its size and frequency, but essentially in the fact that it is an industrial center in which conditions relatively new to the human race have developed, and to whose biological and psychological conditions there is as yet no certainty whether humanity can adapt itself.

The cityward drift of population in the United States is clearly shown by the following tables:[1]

POPULATION IN PLACES OF 8,000 INHABITANTS OR MORE, 1790-1920

Census Year	Total Population	Places of 8,000 Inhabitants or More		
		Population	Number of Places	Percentage of Total Population
1920	105,710,620	46,307,640	924	43.8
1910	91,972,266	35,570,334	768	38.7
1900	75,994,575	25,018,335	547	32.9
1890	62,947,714	18,244,239	445	29.0
1880	50,155,783	11,365,698	285	22.7
1870	38,558,371	8,071,875	226	20.9
1860	31,443,321	5,072,256	141	16.1
1850	23,191,876	2,897,586	85	12.5
1840	17,069,453	1,453,994	44	8.5
1830	12,866,020	864,509	26	6.7
1820	9,638,453	475,135	13	4.9
1810	7,239,881	356,920	11	4.9
1800	5,308,483	210,873	6	4.0
1790	3,929,214	131,472	6	3.3

URBAN AND RURAL POPULATION OF THE UNITED STATES: 1880–1920

Class	1920	1910	1900	1890	1880
Urban	51.4	45.8	40.0	35.4	28.6
Rural	48.6	54.2	60.0	64.6	71.4

[1] Fourteenth Census, *op. cit.*, Vol. I, p. 43.

The Passing of the Frontier.—"The frontier, in the sense of a broad belt of fertile and accessible free land, with the timber, minerals, waterpowers, and other resources going with the land, all open to utilization by citizens on the individualistic basis, passed away with the nineteenth century itself. Its disappearance was unobserved by the masses of the people. Only those who were intent on large-scale exploitation and were organized for it paid proper heed. And the result was that every kind of free material wealth still left—timber, coal, copper, fertilizer deposits, range lands—was rapidly engrossed by private individuals and by corporations."[1]

With the passing of the frontier there closed the first period of American history. With it passed the determiner of high wages, the insurance against unemployment and old age, the ever-new and easy opportunities for the unsuccessful, the free and open democracy of its communities, and all those other forces and influences in our collective life which had resulted from it. Considering the population as a whole, by the opening of the twentieth century we were passing the parting of the ways, and the assistance that the frontier had rendered in restraining the evil tendencies of capitalistic production was no more.

These and other less prominent factors transformed American life. And they did so with miraculous speed and certainty. In 1880 we were a nation of farmers, with some incidental industrial development. By the close of the century we were the leading industrial nation of the world, with some considerable raising of food products.

Social Well-being and the Transformation in American Life.—Such a transformation, even under the most favorable circumstances, could not but entail considerable costs. Not only did it create entirely new conditions of life and of the making of a living, but the thing of most curious significance about the factors in this transformation has been that to the extent and at the rate which they raised new problems they eliminated, too, the customary methods of meeting them.

[1] Cleveland, F. A., and Schafer, Joseph, *Democracy in Reconstruction*, Houghton Mifflin Company, 1919, pp. 19-20.

The problems of modern industry developed alongside of the passing of the older personal relationship between employer and employee. In that racial miscellany which we call the American city, the friendly offices and mutual aid of the older community found no place among its multiplying problems. And quietly but surely the frontier, which might have softened the cold harshness of it all, passed away. Small wonder, then, that social welfare problems have increased in number and intensity and variety throughout the twentieth century, that even America is beginning to sense what they really involve, and with a somewhat childish gesture of irritated impatience is turning her attention to them.

THE INUNDATION OF AMERICA

From 1820, since when official records have been kept, until 1925, more than 36,000,000 immigrants have been admitted into the United States. This does not include those who have made entry in devious unofficial ways, and there is no way of estimating the number of such cases. This recorded migration "is the most stupendous mass movement in the world's history. Nothing even faintly approaching it, either in volume or in variety, has ever been known. No other nation has had to deal with such a vast and continuous human flood. And no human flood of similar magnitude has ever arisen so unexpectedly or deluged a country within so short a space of time."[1]

From the standpoint of the dimensions of this incoming human flood three stages may be noted. The first period covers the first seventy years of our national existence. From 1776 to 1820 the total number of immigrants is estimated at 250,000. From 1820 to 1846 the number recorded per annum averaged less than 50,000, and the total not quite 1,250,000. To speak of the "stream" of immigrants during this period is to employ an aptly descriptive phrase.

In the second period, from 1846 to 1890, the stream became a flood. Within the first ten years of this period, approx-

[1] STODDARD, L., *Re-Forging America*, Charles Scribner's Sons, New York, 1927, p. 91.

imately 3,000,000 immigrants entered America. There was a decline, but far from a cessation, during the Civil War, but by 1866, the movement resumed its flood-like proportions, so that by 1890, the total number of admissions was in excess of 15,500,000. The population of the United States in that year (1890) was not quite 63,000,000.

Then came the deluge. "It was in the period from 1890 to 1914 that immigration really inundated America. During these twenty-four years no less than 17,500,000 immigrants entered the United States. . . . The outbreak of the Great War in 1914 caused a sharp drop in immigration. . . . Even as it was, over 5,000,000 more immigrants entered the country in the decade from 1915 to 1924—an average of over 500,000 per year."[1] In other words, the United States, in 1890, with a population of 63,000,000, having already received 15,000,000 during its national existence, was destined to pass through another quarter of a century in the course of which more than 22,000,000 additional aliens were to be admitted.

The Immigrant's Problem of Adjustment.—Man is largely a creature of habit. To most persons life consists in large measure of habitual responses to the demands of a fairly fixed environment. When man changes his environment, new and perhaps untried responses are called for. New adjustments must be made, as we say. The greater the change, and the more suddenly made, the greater the problem of adjustment, and usually the more difficult.

"The problems of the migrant, therefore, are largely those due to changes in environment, both physical and social. . . . This concept is fundamental to all considerations of migration. Back of the present attempt to deal with the immigration problem in America through the 'quota' plan which allows a larger number of immigrants from countries with environments similar to our own than from countries with different environments, lies this idea; not, as many of its opponents and some of its advocates claim, a conception of racial superiority and inferiority."[2]

[1] Stoddard, *op. cit.*, pp. 92-93.
[2] Dexter, R. C., *Social Adjustment*, A. Knopf, 1927, p. 341.

The problems created by immigration, both for those who came and for those who received them, have been greatly complicated and intensified by the complete change that has occurred within the last half century in the type of immigrants admitted. As is well known to all students of the subject, about 95 per cent of those who arrived prior to 1883 were from the north and west of Europe. This is spoken of as the "old" immigration. The "new" immigration hails from southern and eastern Europe, from Asia and from Africa. By 1907 this type constituted 81 per cent of all European immigration, and by 1914 only 10 per cent of the entire immigration came from northern and western Europe. Of the more than 10,000,000 immigrants who entered the United States in the ten-year period preceding the World War, 23 per cent came from the then Austro-Hungarian Empire, 23 per cent from Russia, and 22 per cent were Italians. Less than one-tenth (9.6 per cent) hailed from the United Kingdom, and the Scandinavians constituted but 4 per cent.[1]

The significance in this connection of the change in the character of immigration must be apparent. The earlier immigrants came from countries whose culture was largely and fundamentally similar to that of the country which they entered. The more recent arrivals, on the other hand, have brought "racial stocks, ideas, and attitudes toward life" essentially "alien" in character. This means, of course, that their problems of adjustment are many times more numerous and more difficult. The problems peculiar to recent immigrants result largely from the fact that they form a connecting link between two distinctly different civilizations. They are confronted by the necessity of making a transition from one group of standards to another, from a culture that is old and fixed and simple and rural to one that is new and itself in a state of flux. But perhaps most significant of all is the fact that the primary group system which dominated their life in the old world disintegrates under the influences of the forces that are reorganizing life in the new, so that here again the indi-

[1] Jenks, J. W., and Lauck, W. J., *The Immigration Problem*, sixth edition, Funk & Wagnalls Company, 1926.

vidual emerges to face relatively alone the problems of a changing world.[1]

The Immigrant and the Problems of Social Well-being.—If all of the immigrants who have entered the United States had come from countries with cultures essentially the same as ours, their very numbers, particularly in relation to the period of time within which they arrived, would have created problems of the first magnitude. If, on the other hand, only one-tenth as many had come, but representing civilizations essentially different from ours, the problems resulting would have been equally serious, although of a somewhat different nature. What has actually happened—the combination of both volume and variety—has resulted in a situation that is perhaps without parallel in historic times. What the outcome will be is still another story. It does seem conservative to say, however, that every problem of social well-being has been complicated and intensified by the presence of the immigrant, and that innumerable new ones have been created by his coming.

THE HETEROGENEITY THAT IS AMERICA

Like a drop curtain against which every scene appears is the racial composition of the population of the United States, and it is against this background that every social problem in America must be considered. It is a curtain made up, like Joseph's coat, of many colors. A mere recital of the facts will enable the reader to visualize its ethnic coloration. The following table shows the nativity and parentage of the population in 1920:

Classification	*Percentage*
Native-born white of native parentage	55.3
Native-born white of foreign parentage	14.8
Native-born white of mixed parentage	6.6
Foreign-born whites	13.0
Negro	9.9
Indian	.2
Chinese	.1
Japanese	.1
	100.0

[1] PARK, R. E., and MILLER, H. A., *Old World Traits Transplanted*, Harper & Brothers, 1921.

This distribution, of course, is for the entire United States. Each part of the country has its own peculiar make-up and resultant problems.

What is tabulated by the census authorities as foreign white stock, consisting of the foreign born and the native born of foreign or mixed parentage, constituted in 1920 a total of 36,398,958, or 34.4 per cent of the population. The following table serves to show the distribution of this element by country of origin, as of 1920:

COUNTRY OF ORIGIN	PER CENT DISTRIBUTION
Northwestern Europe	*31.6*
England	6.3
Scotland	2.0
Wales	0.6
Ireland	11.4
Norway	2.8
Sweden	4.0
Denmark	1.3
Netherlands	1.0
Belgium	0.3
Luxemburg	0.1
Switzerland	0.9
France	0.9
Central and Eastern Europe	*43.4*
Germany	19.9
Austria	8.6
Hungary	3.1
Russia	10.6
Finland	0.8
Rumania	0.4
Bulgaria, Servia, and Montenegro	0.1
Turkey in Europe	0.1
Southern Europe	*10.4*
Greece	0.6
Italy	9.2
Spain	0.2
Portugal	0.4
Asia	*0.5*
America	*9.4*
Canada—French	2.3
Canada—other	4.8
Newfoundland	0.1
West Indies	0.1
Mexico	2.0
Central and South America	0.1
All Other	*0.3*
Of Mixed Foreign Parentage	*4.1*

Striking and significant as these tables of percentage and country of origin are, they do not tell the whole story of the diversity in our national make-up. Italy, for example, is one name on the above list, yet there are markedly different types of Italians. A north Italian and a Sicilian may differ more from each other than either does from a Spaniard. Russia, Austria, and Germany are names of nations, but each comprises very distinct cultural and racial types.

Another cross section of the population may be taken on the basis of religion. Orthodox and Reformed Jew, Roman Catholic and Greek Orthodox, Episcopalian and Presbyterian, Lutheran and Methodist—these are but a few of the many groupings on the basis of religious belief, each involving somewhat definite points of view, scales of value, standards of recreation, and the like. Only in part does such a classification of the population coincide with one based on national or racial lines.

Each group or element in the population may be divided in turn on the basis of length of residence in this country. Successive generations of the same stock represent different types again, each with its own group characteristics, psychology, and peculiar problems. This fact is often lost sight of, but is of particular significance, and in many ways.

American Heterogeneity and Programs for Social Well-being.—Professor Ross has written pertinently of the effect of heterogeneity on the soul of society. He says: "In a society governed from outside or above—Egypt, for example—the introduction of strangers, provided they are law-abiding and industrious, may do no harm. But a democratic society, in which government, laws, and moral standards are the outcome of common understanding, suffers as it becomes more heterogeneous in composition. The unworthy are able to slip into power because groups of worthy citizens are pulling different ways. When a people is so like-minded politically that fundamentals are taken for granted, it is ready to tackle new questions as they come up. But if it admits to citizenship myriads of strangers who insist on threshing over again old straw—the relation of church to state, of church to school,

of state to parent, of law to the liquor trade—ripe sheaves ready to yield the wheat of wisdom under the flails of discussion lie untouched. Pressing questions—public hygiene, conservation, the control of monopoly, the protection of labor—go to the foot of the docket and public interests are not looked after." [1]

In such a heterogeneous mass, then, what Professor Giddings calls the "consciousness of kind" is slow to develop, combined action is difficult, and a heartless individualism is fostered. Many parts of the United States, especially the cosmopolitan urban centers, are under boss rule today because no other system of government is possible. Plans of social betterment do not represent the consensus of public opinion, as a rule. To be brutally frank, all that is possible in many centers in the way of plans for social well-being are the projects of private beneficence on the basis of private judgments, and such public projects as political bosses are willing at the time to indorse. To say anything else is to toy with a fiction, pleasant but not seriously to be entertained.

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[1] Ross, E. A., *The Principles of Sociology, op. cit.,* p. 16.

CHAPTER XXVIII

CHANGING OBJECTIVES IN SOCIAL WELL-BEING

THERE never has been a time when individual cases of need have not challenged the attention of the group. As old as are the problems of ill-being, so old are the practices of giving aid and of moralizing or philosophizing about such cases. Treatment and philosophy have been bound up inextricably with each other as successive stages in the evolution of both have developed. It is the purpose of this chapter to point out the several basic objectives in the efforts of times past to promote the social well-being.

THE ALLEVIATION OF NEED

For many centuries man apparently was impressed with the resultant need rather than the causative conditions in the lives of his unfortunate fellows. His objective in dealing with such problems, accordingly, was that of alleviation. Various terms have had their vogue historically to designate such aid. Alms has been an old and much-used word. Later, charity was used almost universally. More recently the high-sounding term philanthropy was employed, only to give way to relief and rehabilitation. Regardless of terms used, however, the purpose has been essentially the same—the alleviation of those already in need or in distress.

The Motives of Alleviative Treatment.—Underlying such alleviative efforts, one finds various motives. First is the motive of sympathy. Psychologists appear loath to speak of an instinct of sympathy, but throughout the ages an interest in those in distress has found a haven in human hearts and moved them to kindly acts.

The religious motive is very general. Religion early annexed the relief of distress to its realm and made an act of charity pleasing to the deity. A saint with his bowl is one of

the traditions of the Orient. The religious systems of the Eastern countries advanced charity as one of the roads to salvation. The holy men of Brahma in India live by alms, which it is the duty of the faithful to give. A Hindu proverb has it that "He who giveth without stint to a fatigued wayfarer obtaineth merit that is great." Similarly, the Hebrews laid great stress upon charity. The Talmud reminds us that "The house that does not open to the poor shall open to the physician." The Old Testament abounds with intimations that one might "break off his iniquities" by "showing mercy to the poor." The book of Ruth gives a beautiful picture of the gracious custom of gleaning. The Jewish synagogue was a center for the distribution of alms. With the coming of Christianity, charity as a cardinal virtue came to be emphasized anew, by both the teachings of the fathers and the requirements of the early Christian congregations. Saint Cyprian insisted that "He who will at the Day of Judgment reward alms and good works listens more graciously even today to a prayer if it is accompanied by alms." Saint Augustine went so far as to say that "alms have the power to extinguish and expiate sin," a sentiment to which the latter practices of the church bore eloquent tribute.

Another motive has been the political one. Centuries ago the crafty politician discovered the power-getting possibilities of largesses. The Roman emperors distributed corn and other commodities to the public. It is estimated that Nero gave away during his reign nearly $100,000,000 from the public treasury to the people for food. The Roman populace was not only fed at public expense, but even amused. "The politicians vied with one another in lavishness of gifts in order to gain the votes of the people, both before election and after being put into office. This giving, which eventually all came out of the public coffers, probably exceeded the amounts contributed directly to the support of the people. These politicians not only recuperated themselves after getting office, but also took the opportunity of filling their pockets besides, till it came to be the custom for a consul, upon being given his province after retirement, to consider this his opportunity

to recoup himself. In the one year that he held the province he had to make three fortunes: first, one to pay off the debts he had incurred getting into office; second, one to pay off all lawsuits after he got out; and third, enough to keep himself in luxury the rest of his life."[1] In recent years many social workers have had occasion to understand some of the reasons for the hold of the ward boss upon his constituency.

One must not forget the importance of the desire for social prestige as a motive in this connection. Veblen's volume on *The Theory of the Leisure Class,* points out the competitive ostentation in modern society, resulting from the fact that the status of men is established partly by the show of wealth made by their wives. A display of interest in "uplift" work is one of the forms which this competitive display often assumes. No one who knows modern social work through its volunteer workers and the membership of boards of charitable organizations will fail to appreciate this, albeit with tongue in cheek.

It is necessary to include another motive which, for want of a better term, will be called the motive of safety. Not infrequently the gifts of the wealthy have been given with the hope of silencing criticism and paralyzing any movement for the correction of fundamental wrongs. "In the bad old days of bank failures, the capitalist who had slipped out of the back door of a bank with a satchel of loot, while the tricked depositors were yammering in vain at the front entrance, sought to turn aside public odium and win his way back to respectability by a consistent course of diplomatic and ostentatious giving. Public utility companies have often made a point of subscribing to charitable and civic undertakings, and their generosity has fluctuated pretty closely with the imminence of attack upon their privileges and their policies.

"The resort to philanthropy as a means of propitiation becomes more general as the public becomes more and more critical of the ways of business. A dozen years ago it was often predicted that 'muck-raking' would so wound, exasper-

[1] Dow, G. S., *Introduction to the Principles of Sociology,* Baylor University Press, Waco, Texas, 1920, pp. 396-397.

ate, and alienate the rich that the foundations of benevolence would dry up. Exactly the opposite has occurred. Exposure has a wonderful effect in loosening the purse-strings of the exposed and the exposable. As the impertinent question, 'Where did he get it?' becomes more insistent, and busybodies with lanterns go poking and peering about the foundations of majestic fortunes, the rush to philanthropic cover becomes ever more noticeable." [1]

This brief analysis of the motives of alleviative effort is not presented in cynical vein, nor with any implications of discredit for this type of service. The alleviation of suffering and distress is always beautiful, even though marred at times by selfish motives. At its best, it has found expression through some of the most beautiful characters in history. There is, for example, St. Francis of Assisi, that lovable monk of the Middle Ages, who truly gave his life in service to others; or Charles of Milan, who stripped his bishop's palace to clothe the plague-stricken sufferers in his diocese; or Florence Nightingale, whose shadow the wounded soldier kissed as it fell across his cot. But not all alleviative service has sprung from such sources. Like all large-scale activities, it has resulted from many and varied motives. It is necessary to understand its many-sided nature if we are to appraise its value.

The Failure of Alleviation.—Parallel with the increase in recent decades in the number and complexity of the problems of social well-being there has been a growing recognition of the inadequacy of the alleviative type of service. The reasons for this accumulating appreciation of its failure have been set forth in a recent historical survey. "Indiscriminate alms-giving has pauperized many and has frequently created a veritable profession of begging. To be sure, the civilized world had pretty generally eliminated large-scale doles like those which disgraced Greece and Rome, and which appeared at many a monastery during the Middle Ages, but the ravages of war have brought back something which may easily degenerate into just such promiscuous largesses as those of bygone

[1] Ross, E. A., *The Social Trend*, The Century Company, New York, 1922, pp. 122-123.

centuries. . . . In the second place, the old-fashioned charity has failed in that it gave attention only to those already in trouble, and usually overlooked the sources from which the trouble came and from which similar trouble was sure to continue to come unless those sources were discovered and eliminated. The attitude apparently was that of assuming 'the poor ye have always with you.' Providence was held responsible for sending the poor, and it was not for mere man to inquire into the reasons for their distress. Even in our own day corporations have established welfare departments to disburse medicine to the sick and comfort to the bereaved, and have simultaneously fought legislative measures designed to prevent occupational diseases and accidents. . . .

"A third reason for the failure of the traditional philanthropy has been its general limitation of its attention to individual problems. This narrowness is less true of modern 'case work' than of medieval almsgiving, but it still restricts the usefulness of many charity organization societies. Indeed, it seems to be the attitude of many case workers that the way to salvation lies chiefly through the rehabilitation of individual families, and that programs of community work and of national reorganization are of secondary importance. . . .

"Very often charity as such has failed because it is undemocratic and implies a caste order of society. In an earlier day, it regarded the presence of poor people not merely as unavoidable, but as a public asset. Their persistence made possible the practice by the well-to-do of the Christian virtue of charity. The giving of alms increased one's pride and self-respect. . . ." [1]

To these causes, all of which were inherent in the type of service rendered, must be added this additional and rather significant fact:—viz., that the very great increase in the number of problems resulting from the transformation of our industrial and social life served to reveal dramatically and on a large scale the shortcomings of alleviation as a social method

[1] QUEEN, *op. cit.*, pp. 61-63.

and policy. It was the sudden creation of a considerable amount of social ill-being which shocked society into a somewhat precipitate facing-about and examination of the problems themselves and the traditional ways of dealing with them. What happened is a matter of not uncommon experience. Inefficiency passively permitted because trivial becomes intolerable when duplicated on a larger scale. It was the rather extensive failure of alleviative work which emphasized the necessity for some more fundamental approach to the problems of social well-being. This was destined to come as a result of the application of scientific methods to human society.

THE SCIENTIFIC VIEWPOINT AND SOCIAL WELL-BEING

What is termed the industrial revolution is really but a resultant phase of a transformation much more fundamental and far-reaching than any change or series of changes in the industrial world, significant though they be. This larger movement was the scientific revolution. What it involved fundamentally was a new attitude on the part of man toward the universe, toward life in all its forms, toward himself, and toward the problems confronting him. It has been customary in recent years to say that the industrial revolution explains and accounts for the world we live in. This is but a partial truth. It is science which explains modern civilization and is responsible for it.

It so happens, somewhat naturally, that the scientific revolution first found tangible expression in man's effort to save labor—in new ways of producing goods, and subsequently, in new ways of transporting about these goods as well as himself. Stated in general terms, what happened during the nineteenth century, and what essentially characterizes and distinguishes that century, was the large-scale application of science to physical problems. Techniques of observation and experimentation were developed as a result of which men gained an insight into and a control over the material world far beyond the wildest dreams of men prior to that time. As the century progressed, this experience was repeated in the

field of the biological sciences, with the resultant elimination of diseases which had plagued humanity since time immemorial. In both spheres, it is significant to note that control followed understanding. Scientific investigation revealed the forces and relationships at work, and on the basis of that knowledge men speedily learned to control and to utilize them for human advantage.

Thus inspired, it was inevitable that thoughtful men should begin to ask: Will not scientific methods of dealing with social problems yield equally valuable results? Will not scientific analysis when applied to society furnish us with the same insight into, and make possible an equal control over, human relationships that it has yielded in mechanics, physics, chemistry, bacteriology, neurology, etc.? May we not look forward to the day when science applied to society will enable social engineers to deal with social problems as effectively as mechanical engineers handle their problems? As the physical sciences are going to the root of their problems, may not the social sciences similarly get at the underlying causes of maladjustment and social disorganization?

In the opening years of the twentieth century, these questions began to receive serious consideration. Writing in 1910, Professor Ross says: "Within ten years a wonderful hopefulness has entered the hearts of social workers. They have not been giving quite all their time to helping the human wrecks that file in endless procession before them. They have done a little exploring. They have followed up the feeders of this river of human misery, the origin of which has been as much shrouded in darkness as the sources of the Nile. They have located some of the principal springs of evil and, to their wonder, they are not defects in human nature at all but 'adverse conditions'—that can be removed. Hence they are beginning to tell us that poverty is as curable as tuberculosis. They insist that most of the sources of crime can be stopped up." [1] In other words, just as the nineteenth century witnessed the application of science to the problems of the physi-

[1] Ross, E. A., *Latter Day Saints and Sinners*, B. W. Huebsch, New York, 1910, p. 46.

cal world, so the twentieth century is seeing its utilization in the realm of social phenomena.

The evolutionary viewpoint of modern science, which sees the present as the child of the past and the parent of the future, inevitably implies the caused relationship of all phenomena. Modern science is basically causal in its interpretation. It may be that the principle of causation is the outstanding contribution made thus far by the social sciences. At any rate, with an appreciation of this fact in the study of social problems:—*viz.,* that these problems result from ascertainable causes, the idea of prevention came to be emphasized. Twenty years ago this idea was hailed with all the enthusiasm of a new discovery. As further study disclosed new causal relationships, and clarified those previously recognized, prevention speedily became the dominant motif of efforts to promote social well-being.

That an ounce of prevention is worth a pound of cure, that it is better to build a fence at the top of the cliff than to supply an ambulance down in the valley, are commonplace ideas. What is new in this connection is their application to social problems. Like all great advances, the idea involved is so simple that the only marvel is the tardiness of its recognition and the unwillingness for its acceptance.

It is interesting to note in passing a pioneer gesture in the direction of preventive work. As early as the middle of the nineteenth century Robert Hartley had attempted to give concrete expression to this ideal in the New York Association for Improving the Condition of the Poor. The organization of this society, says Devine, "marks an epoch in the creation of valuable literature on the subject of preventive charity."[1] In the language of Mr. Hartley's biographer, "It contemplated, likewise, preventive rather than remedial measures. It was primarily and directly to discountenance indiscriminate almsgiving; to visit the poor at their homes, to give them counsel, to assist them when practicable in obtaining employment, to inspire them with self-respect and self-reliance, to

[1] DEVINE, E. T., *Principles of Relief, op. cit.,* p. 316.

inculcate habits of economy, industry, temperance, and, whenever absolutely necessary, to provide such relief as would be suited to their wants." [1]

Unfortunately, the ambitions of this and other similarly conceived organizations of this early period were doomed to failure. They were too far in advance of their time; popular support, particularly financial, was not forthcoming; and, sooner or later, "all sank into the sea of almsgiving." It remained, therefore, for the first quarter of the twentieth century to translate this vision into an effective reality.

THE IDEAL OF CONSTRUCTIVE SERVICE

Preventive work represents a tremendous step forward, when compared with earlier alleviative effort. For a decade and more we were satisfied apparently to turn over the idea in our minds in contented contemplation, while practice strove feverishly to keep pace with advances in thought. Recently, however, there has come this twofold appreciation: first, that preventive work, after all, is negative; and, second, that no negative program can be the ultimate objective of social effort. Thus, within the last few years leaders in the field of social betterment have come to think in terms of positive ends, aiming at constructive achievements.

A few illustrations will serve to clarify the difference between the negative emphasis of preventive work and the constructive implications of more recent programs. Preventive medicine aims at the prevention of disease. Its purpose is to keep people from becoming ill. A constructive health program plans, on the other hand, to increase a people's vitality and efficiency and to prolong life. Or, let us make the contrast in the field of education. The earlier purpose there was to herd the children into the schools, to reduce the amount of illiteracy, and to banish bigotry and superstition. This program is negative, it will at once be seen, and as education becomes constructive in purpose and spirit the problems emphasized concern the determination of values in education and in life, and their better coördination. Recreation, in a social pro-

[1] DEVINE, *op. cit.*, p. 317.

gram based on the idea of prevention, aims at the elimination of delinquency and street accidents to children. In the constructive stage it shades by imperceptible degrees into a program for a larger life, full of joy, of relaxation, of well-being and happiness. Labor legislation, in a preventive program, considers the protection of workers against exploitation; constructively conceived, it comes to think and work in terms of raising the wage-workers' standard of living.

Other illustrations might be cited, but it should be apparent that the difference between a preventive and a constructive ideal or program is not one of kind, but of degree of development. They are complementary rather than distinctive. Together, they constitute a stimulating hope, opening up vistas of possible promotions of social well-being which defy the imagination of present man to envisage. Such an ideal compels a change in our thinking, and results ultimately in the complete reshaping of all our plans and programs. It is neither a criticism nor a cynicism, but a simple recognition of fact, to add that for some time as yet leaders in social betterment will be apt to talk constructively while they are thinking preventively, and that those following them will be learning to think preventively as they continue to work curatively.

THE NEED FOR FACTS

All modern efforts to promote social well-being, whether of negative or of positive emphasis, presuppose a knowledge of the causative factors involved. Careful and prolonged study of these factors must precede the formation of intelligent and constructive programs. Unfortunately, the majority of persons are apt to lose patience when this point is emphasized. "We know the causes of our problems," they insist. "What we want to know is how to solve them." With this view the social scientist must sharply disagree. We have not yet made much progress in the "solution" of our social problems because we have not understood fully their causes. Diagnosis and etiology constitute the most difficult part of medical practice. Every physician appreciates this fact. The chief reason for this difficulty is because the real causes of ailments

are frequently removed from the symptoms. An intense pain in the stomach is attributed ordinarily to something we have eaten. In reality, the trouble may be defective eyes. An irritating rheumatic knee or chronic constipation are now found often to result from abscessed teeth. Frequent colds may be the result of chronic appendicitis. Mental and nervous disturbances are often due to obscure focal infections. Modern medicine has come only recently to a realization of the relation between obvious symptoms and rather remote causes of them.

Human society is much more complex than the human body. This means, then, that the difficulties of ascertaining the causes of social ill-being are correspondingly greater; that these causes frequently are farther removed and more peculiarly related to the condition considered than in the case of the human body. In the social as in the medical field, it is easy to make a diagnosis, inclusive of etiology, but to do so correctly is, as Kipling puts it, still another story. There is a tragic humor in the confidence and positiveness with which causes of ills in the complicated social structure are assigned constantly, and at the very time when we are gaining a new appreciation of the difficulties of doing so correctly in the case of the relatively simple human structure. Some day, perhaps, a great humorist will consider the matter with adequate justice.

It is a curious commentary, too, on human intelligence to find how generally in our modern social efforts elaborate programs have preceded careful study of causes, how seldom students of causes and advocates of programs have emphasized the same factors, how contemptuous of each other even these two groups have been at times. Manifestly we have not thought clearly in these matters. And it is not simply in popular propagandas that one finds these odd inconsistencies, but they are to be found to a marked extent in the field of so-called scientific social work.

As the real nature of the problems of modern society come to be known, as the factors which produce them are identified and appraised properly, and to the extent that action in-

telligently shaped by the facts will be taken, there is every reason to suppose that entirely new developments and emphases will appear in our social programs. We may come to do things even more strange than pulling a tooth to clear up a rheumatic knee. To cite a fairly obvious example, in dealing constructively with the problems of mental disease, our chief efforts may take us far afield in the direction of reconstructing popular sex standards or the content of medical training. Or, unemployment in Akron, Ohio, may necessitate skillful diplomacy at the court of St. James's. Certainly it would seem clear that the time has come even now to reorganize discussions and studies of social problems. There really seems to be no reason to continue dealing with the end products of social ill-being. Thinking constructively, the elimination of industrial accidents needs emphasis more than the care of dependent children; the problem of preventable death is more fundamental than that of widowhood, even if somewhat less dramatic; the control of gonorrhea contributes more to social well-being than the education of blind youth. It has been the hope underlying these pages that the more basic matters have been considered.

CHANGING METHODS OF STUDY

It must not be assumed, because of the present-day insistence for more and ever more facts concerning social problems, that these problems have just begun to be studied. To do so would be quite incorrect. Man has always speculated on the problems which confront him, and the rise of the pressing ones which attended the emergence of the present social order could not but have attracted the attention of able and earnest students. It would seem entirely pertinent, then, to review at this point the evolution of the study of the problems of social well-being, to the end that the future may profit from the experience of the past. Because of the constant interest of earlier students in the resultant condition, which was poverty, this review must center quite largely about its analysis and study.

The Single Explanations.—It seems to be an outstanding

habit of many minds, born from laziness or ignorance or lack of mental ability, to seek a single explanation for phenomena, no matter how complex they may be. Although, as has been pointed out, the phenomena with which the student of society must deal are complex beyond those in any other field, there has been a general tendency historically, and a widespread insistence still on the part of the great mass of people, to deal with them in a simple and dogmatic manner. Even so selected a group as university students are asking constantly for THE cause and THE solution of a given social problem. Thus early there arose "deductive and philosophical thinkers who, from the well-known facts of social organization, have sought to deduce the causes tending to poverty, as a systematic writer on pathology seeks to set forth the inherent characteristics of the bodily organism which tend to make disease likely or inevitable." [1] Some of the more intriguing of the single explanations that have been offered will be reviewed briefly at this point.

Challenged by the contention of William Godwin that the repeal of government and law would make possible the existence and permanence of a society, "all the members of which would live in ease, happiness, and comparative leisure," Thomas Malthus wrote, at the close of the eighteenth century, his famous "Essay on Population." Human misery, he insisted, was not the result of human injustice and bad institutions, but of an inexorable law of nature—*viz.*, that population tends to outstrip the means of subsistence. As a result, even in a few generations this would counteract the effects of the best institutions that human wisdom could conceive. The inevitable pressure of population upon food supply is the fundamental cause of human poverty and misery. Many of the ablest thinkers of the nineteenth century accepted this view and explained poverty in Malthusian terms. Other causes were recognized, it is true, but were looked upon as either resulting from or contributing to this fundamental

[1] WARNER, AMOS G., *American Charities,* revised by MARY R. COOLIDGE, Thomas Y. Crowell Company, New York, third edition, 1919, p. 36.

factor. The Iron Law of Wages was built upon it, and John Stuart Mill allowed his economic philosophy to be overshadowed by it.

Karl Marx and his followers offered an equally sweeping explanation of why, in the words of the Communist Manifesto of 1847, "The modern laborer . . . instead of rising with the progress of industry, sinks deeper and deeper below the conditions of existence of his class." The explanation is to be found in the exploitation of labor by capital. The capitalist class grows rich through the appropriation and accumulation of surplus value while the proletariat is reduced to a subsistence wage. "Labor is paid for, but not paid." In the hands of Marx's followers, this has been construed to mean that the present capitalistic system is a method of exploitation, imposing absolute failure on large numbers of wage-earners and rendering the grip of the vast majority on a standard of living precarious in the extreme.

So, too, did Henry George find an all-sufficient explanation of poverty. "The reason why, in spite of the increase of productive power, wages constantly tend to a minimum which will give but a bare living, is that, with increase in productive power, rent tends to even greater increase, thus producing a constant tendency to the forcing down of wages." [1]

Herbert Spencer found poverty and its problems to be the result of natural forces in the struggle for existence. Life is struggle, the fittest tend to survive, and social debtors, species of the unfit, tend to be eliminated. Poverty, then, is the inevitable accompaniment or incident of the working out of natural selection in social evolution. "All the poverty and misery permeating the civilized states, except such as is deliberately self-inflicted or the result of ill-health, are due to temporary and local mistakes in legislation." [2] Thus did he paraphrase the *laissez-faire* creed of his individualistic age. To him, at least, its meaning was clear. The poor should be

[1] George, Henry, *Progress and Poverty,* The Macmillan Company, New York, 1911, p. 280.

[2] Quoted from Hollander, Jacob H., *The Abolition of Poverty,* Houghton Mifflin Company, Boston, 1914, p. 14.

let alone. In the struggle for existence they cannot but in the long run need to be eliminated.

To these theories, which blamed each in its own way some factor inherent in the scheme of things, still others seemed to add insult to injury by blaming on the individual the lapses its own perverse social arrangements have caused. A group of theologically-minded students found the fundamental cause of it all in the "smug conviction that all poverty is the result of sin—the consequence of thriftlessness, prodigality, intemperance, unchastity, and even irreligion. Economic want thus becomes the penalty of moral or spiritual lapse, destined to endure because men falter in conduct or in faith." [1] This conception of a close interrelation of sin and suffering is a very old one, and, of course, exceedingly comforting to the more fortunate ones who cherish it. Thus did the prophets of the Old Testament, prior to their discovery of social injustice, explain the calamities that befell the chosen people.[2] In similar vein does the Psalmist reflect when he confesses that "I have been young and now I am old, yet I have not seen the righteous forsaken nor his seed begging bread," [3] while the Book of Proverbs abounds with references to the poverty caused by love of pleasure, wine, oil, and harlots.[4] Modern temperance propagandists have specialized this conception, and insist that the great majority of social debtors are the fruits of intemperance, just as the apostles of purity find their source in the abuse of the sexual nature, and a certain type of strenuous and successful citizen interprets the entire problem in terms of laziness and just pure "cussedness."

All of these theories have some basis of fact. Many of the advocate-philosophers mentioned dealt with actual conditions at considerable length. But the data which they cite must be classified as "after the fact." They were gathered to illustrate a conclusion which had already been formulated. The error in all of these single explanations consists in the effect to make a partial explanation the entire one, which operation in

[1] Hollander, *op. cit.*, p. 16.
[2] Amos, 4:6.
[3] Psalms, 37:25.
[4] Proverbs, 21:17, 6:26.

itself makes them false. Social ill-being results from the operation of many causes, not of one of them. To single out any one cause as responsible for the distress of any group is naïve but worthless. It is the sort of thing which all too often has been the bane of social science in the past.

The Case-counting Method.—The development and multiplication of various relief and social-welfare societies during the nineteenth century, together with the beginnings of simple case records, separated the mass problem into its individual units and placed at the disposal of students a large amount of concrete material for analysis. Stimulated by the inductive emphasis of modern science, statistical tabulations of this data began to be made. Thus originated what is called the case-counting method of studying social problems.

The inception of this method was hailed with great enthusiasm, for it was believed that by thus counting a large number of individual cases generalizations of value could be made. But its use soon revealed rather limited possibilities. To begin with, the factors encountered could not always be identified, even in the rather superficial records made. One case history, briefly summarized, will serve to illustrate the point. Thomas Swanger was blind. His sister lived with him, serving as housekeeper. Both were employed, Thomas in a broom factory, his sister in a mill. Then the sister died of tuberculosis. Several months afterward Thomas contracted a marriage with a young woman who proved to be an inefficient housekeeper and prone to drink to excess. Under her influence, Thomas, too, drank to a certain amount. Some time after his marriage he had an altercation with his employer and ceased to work in the broom factory. In his next position he had access to the cash drawer. Unfortunately, his blindness seemed to prevent him from always distinguishing between the cash drawer and his own pockets. Subsequently he was discharged. His wife left him soon afterward and he applied for relief. How, now, shall this case be tabulated in any enumeration of the causes of need? Was Thomas's difficulty one of blindness? Or was it dishonesty, or drink, or his

wife's desertion, or the marriage he contracted, or his sister's death, or his quarrel, which cost him the position in the broom factory? These and other questions promptly suggest themselves.

Nor does the interest of the student end in obvious questions such as these. Why was Thomas blind? Was it a case of gonorrhea of parents? Did the law require the use of prophylactics at birth, and did the physician administer them? Was the sister's tuberculosis the result of conditions in the mill where she was employed? Why was his wife an inefficient housekeeper? Such questions illustrate a second weakness of the case-counting method. The character and the conditions of the individual case were the facts emphasized. But these are the obvious and immediate results of causes more remote. Back of inefficiency may lie malnutrition or an inadequately motivated individual; behind typhoid fever may be impure water or milk; and back of that a black page of city politics and municipal indifference. Sickness is more obvious than bad sanitation; laziness is apparent, but not necessarily its connection with a malarial climate. Deterioration of character is thus apt to be tabulated in such a study, while the primary factor may be defective environment. One need not be surprised, therefore, to find that the case-counting method led to an overwhelming emphasis on subjective causes, which, under the prevailing philosophy of the nineteenth century, resulted in a great deal of discussion and the ultimate classification of social debtors into two main groups—the worthy and the unworthy cases. Preoccupied with subjective causes, blame had to be allocated.

The Pictorial Method.—The case-counting method, involving difficulties and limitations such as these which have been noted, led in time to what might be called the pictorial method of studying social problems. The essential feature and aim of this method is the comparative study of a whole section of the population in an effort to ascertain the forces and conditions which create dependency. The use of this method led to the production of such studies as Booth's monu-

mental work on the life of the people of London, Rowntree's *Poverty,*—a study of conditions in York, Peter Robert's *Anthracite Coal Communities,* and many other and more recent works. Such an approach gave a breadth and perspective of view not gained by case-counting, for it revealed the underlying and predisposing causes, which was exactly what the last named lacked.

Just as the case-counting method emphasized the individual or subjective causes and led to a distinction between the "worthy" and the "unworthy" poor, so the pictorial method resulted in a swing of emphasis upon the social causes and the conclusion that every society had about as many individual failures as it deserved. Edward T. Devine's *Misery and Its Causes* reflected the crest of development of this philosophy. "In contrast with the idea that misery is moral, the inexorable visitation of punishment for immoral actions and the inevitable outcome of depraved character, I wish to present the idea that it is economic, the result of maladjustment, that defective personality is only a halfway explanation, which itself results directly from conditions which society may largely control.

"The question which I raise is whether the wretched poor, the poor who suffer in their poverty, are poor because they are shiftless, because they are undisciplined, because they drink, because they steal, because they have superfluous children, because of personal depravity, personal inclination, and natural preference; or whether they are shiftless and undisciplined and drink and steal and are unable to care for their too numerous children because our social institutions and economic arrangements are at fault. I hold that personal depravity is as foreign to any sound theory of the hardships of our modern poor as witchcraft or demoniacal possession; that these hardships are economic, social, transitional, measurable, manageable. Misery, as we say of tuberculosis, is communicable, curable, and preventable. It lies not in the unalterable nature of things, but in our particular human institutions, our social arrangements, our tenements and streets

and subways, our laws and courts and jails, our religion, our education, our philanthropy, our politics, our industry, and our business." [1]

Here again one notes the tendency to think in terms of blame. Whereas case-counting led to a philosophy in terms of blame (or praise) of individuals, the pictorial method resulted in group indictment. It cannot be emphasized too strongly that the concept of blame has no place in the orientation of the true scientist. This is generally recognized in the field of the natural sciences. No chemist, observing and classifying phenomena in his laboratory, would censure or praise the chemical elements because of the results obtained. The picture of a physicist, fretful and irritated at his elements for behaving as they do, at once strikes us as ludicrous. The situation ought to be no whit different when social phenomena are observed and studied. Because this fact has been so slow in being recognized makes insistence upon it all the more necessary. The object of the scientist must be the understanding of this phenomenon, not the determination of their moral responsibility.

Within the last ten years, the emphasis upon the predisposing factors in society has been receding, with indications that a sort of equilibrium is being reached. Modern social case work insists upon the individualization of its problems, with regard to both diagnosis and treatment. But it no longer sees the individual as an abstract entity, apart from his setting in society. Rather does it deal with individuals who have status—*i.e.*, with personalities. While every problem is an individual one, it is the product of the interaction of many factors, some in the person, some in his social setting. Some really excellent material can now be found in socialized case studies of the better type, and ultimately, let it be hoped, there will be reached through them a set of really valid conclusions to replace the philosophical and one-sided generalizations of the past.

[1] Devine, Edward T., *Misery and Its Causes*, The Macmillan Company, New York, 1909, pp. 11-12.

SOME IMPLICATIONS OF A SCIENTIFIC APPROACH TO THE PROBLEMS OF SOCIAL WELL-BEING

The Nature of the Scientific Method.—The general elements in the scientific method are well known, whatever the particular classification may be and however they be named. Scientific method starts with observation of facts, followed by their recording and comparison. Out of analysis and comparison grows the process of induction which simply means generalization, or reasoning from the particular to the general. Following induction is deduction—*i.e.,* reasoning from the general back to the particular, in accordance with the fundamental laws of logic. Each deduction must be followed in turn by a checking-up process, whereby the earlier generalizations are subjected to the acid test of truth.

"Evidently, then, certain things are essential to scientific method. These indispensables are: (1) a body of observed facts, (2) established generalizations, principles, or laws, the result of previous scientific work, (3) the fundamental laws of thought or logic. (Anyone who thinks that two and two make five, or who calls black white, will not make a successful scientist.)

"To these fundamental essentials must be added certain other equipments or processes, namely, (4) scientific imagination, which aids in directing observation, analysis, and inference, and which enables the investigator to form (5) hypotheses." [1]

The Scientific Attitude.—There is nothing essentially distinctive about the scientific method. Its constituent elements characterize the mental activities of all normal individuals. What is unique about science is not its method, but its application. Everybody is scientific about something. Only a very few persons succeed in being scientific about most things.

The scientific attitude is incomparably more important than the details of any method. "No one can use this method consistently, who has not acquired a consistent scientific atti-

[1] WOLFE, A. B., *Conservatism, Radicalism, and Scientific Method,* The Macmillan Company, 1923, p. 207.

tude. Given the attitude, the corresponding method will follow. In practice it requires a long educational discipline, with emphasis upon the sciences, to secure the scientific attitude in an individual—long not because of any inherent difficulty or complexity in the scientific method itself, since in its fundamentals it is comparatively simple, but because it takes time to dislodge the sentimental, subjective, and prejudicial attitudes fixed in boys and girls by the social controls which are constantly bearing upon them. Few persons ever acquire even a passably consistent objectivity, especially with regard to social problems." [1]

Thomson [2] has stated admirably the characteristics of the scientific attitude or mood, as he calls it. They are (a) a passion and reverence for facts; (b) cautiousness, or distrust of finality and dogmatism of statement; (c) clearness of vision, —a dislike of obscurities, of blurred vision, of fogginess; and (d) a sense of the interrelations of things.

Sociologians and Sociologists.—It is now quite generally recognized that the development and maintenance of the scientific attitude toward social data present peculiar problems. Not all—in fact, thus far rather few—of those who glibly render lip service to science in the social field have entered into its kingdom. Writing as recently as January, 1923, Dr. Franklin H. Giddings, the dean of American sociologists, said: "We who are called sociologists, or call ourselves such (I count myself in), have been sociologians and sociologizers; we are only beginning to be sociologists. The sociologian, like the theologian, builds up a system of thought by synthetic reflection. He does not discover and measure truth by the aid of instruments of precision, nor experimentally distill it. The sociologizer, like the moralizer, improves occasion by admonition and otherwise." [3]

It is a rigorous discipline, but the scientific approach to social problems demands a freedom from preconceived notions. "The problem of dissociating facts from preconceived

[1] WOLFE, *op. cit.*, p. 203.
[2] *Darwinism and Human Life, op. cit.*, pp. 32 ff.
[3] *The Literary Review,* January 27, 1923, p. 414.

theories is not peculiar to social science; it has confronted virtually all the sciences, especially during their formative periods. Even so precise and objective a subject as astronomy was so tied up with theological dogmas during the Middle Ages that men like Galileo and Giordano Bruno were persecuted and even burned at the stake because they reported facts about the stars that were not in keeping with certain theories then current.

"The social sciences, therefore, only find themselves in the same position as were the natural sciences of a few centuries ago when fact and philosophy were hopelessly confused. Just as the exact branches of knowledge had to disentangle facts from metaphysics before they could make rapid progress, so the would-be social scientist must free himself from modern preconceptions. But how is this liberation to be achieved? Here the experience of the physical sciences should help us. How did they gain their present freedom? The answer is simple. Instead of fitting the facts of the world into certain man-made molds, they developed their laws and theories from the facts. This, then, is one of the most obvious and hopeful methods of procedure for social science." [1]

Professional Recognition for Problem Studies.—Sociologists, up to the present time, have been all too contemptuous of the labors of those who have attempted to specialize in the study and treatment of the substandard classes in society. Such persons have been conceived of as just "not belonging" in the ranks of the orthodox members of the guild. It is not unlikely, however, that our chief help in the study of the normal in society will come through a better understanding of the abnormal. Certainly this has been the experience in the field of other sciences which have reached a higher stage of development than sociology has. There is much to be said, and a little is beginning to be said, for building up a new sociology from the bottom. Should this be done, the stone which the builders rejected may yet become the head of the corner, and

[1] Fry, C. Luther, *Diagnosing the Rural Church*, George H. Doran Company, 1924, p. 31.

the philosophical systems upon which it shall fall, it will grind to powder.

THE PROMISE OF THE FUTURE

It is a future bright with hope which lures the social scientist on. "When men turn away from empiricism in the study of social problems and begin to understand that the phenomena of the social world are the products of forces operating according to ascertainable laws, although of a kind different from those in the physical world, there will be strides forward in the social life as notable and full of blessings to the human race as the progress which has been made in any other domain. The world is not without great moral teachers who stir up and sharpen the conscience of the people, but it needs a knowledge of the causes and effects of human activities and institutions, as revealed by science, to enable the moral forces to expend themselves in other than a blind and archaic opposition." [1]

Progress in this direction demands a realization that the achievements of social science lie in the future, not in the past or present. There are as yet few social problems that have been solved by scientific methods. There is nothing discouraging about this, however, for the social sciences are among the youngest in the sisterhood of the sciences. Their sterility is largely that of extreme youth. But if there is today little pride of achievement for the sociologist and his kin, certainly the lack ought to be more than counterbalanced by the challenge of the situation and the hope of reward it holds out.

Finally, there must always be kept in mind the fact that the problems of social well-being are very human problems, and that human problems are not to be dealt with from the angle of any one science, but on the basis of a synthesis of all of our knowledge about man. Life in any of its phases is exceedingly complex, and the key to its understanding must be wrought in the furnace of fiery research, a product of many

[1] Dowd, Jerome, *The Negro Races,* The Macmillan Company, New York, 1907, Vol. I, p. vi.

refined specialties. Not academic triumphs, but intensely human problems—these must be our main interest.

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